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THE REFORMED COMMON-WEALTH OF BEES.

Presented in severall LETTERS and Observations to *Sammuel Hartlib* Esq.

WITH

The Reformed *VIRGINIAN* SILK-WORM.

CONTAINING

Many Excellent and Choice Secrets, Experiments, and Discoveries for attaining of National and Private Profits and Riches.

D. Ward.

LONDON,
Printed for *Giles Calvert* at the *Black-Spread-Eagle* at the West-end of *Pauls*, 1655.

NOBILIS IRA
AVITO VIRET HONORE
James Earl of Bute &c. &c.

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The Reformed COMMON-WEALTH of BEES, Presented in severall Letters to *Samuel Hartlib* Esquire.

The Testimony of an Ancient Writer of Husbandry, of an incredible Revenue, which hath been raised from keeping of Bees.

Varro de Re Rustica, Lib. 3. c. 16.

DE fructu; Autherem habeo non solum qui Alvearia sua locata habet quotannis quinis millibus pondo mellis, sed etiam hunc Varronem nostrum quem audivi dicere item, duos milites se habuisse in Hispania *fratres Vejanos, ex agro Faliſco locupletes, quibus cum a Patre relicta esset parva villa, & agellus non sane major jugero uno, hos circum villam totam Alvearium fecisse, & hortum habuisse ac reliquum Thymo, & cythiso obseviſſe & apiastro; hos nunquam minus, ut peræque dicerent, dena millia Sextertia ex melle recipere esse Solitos*

In English thus.

Concerning the profit of Bees, I have not onely a Witnesse, who saith, that he lets out his Bees for five thousand pounds of Honey by the yeer, but also our friend *Varro* here, whom I have heard say, that he had with him in *Spain* two Souldiers, brethren, and rich, to whom their Father left a small country house, and a little field, in truth, not greater than one acre, and that round about the house they made a place to keep Bees, and a garden, and planted the rest with thyme, cytisus and bawme, and were wont to receive yearly for Honey, reckoning one year with

 another,

another, never lesse than ten thousand Sesterces, which being in the time of the *Consuls* (before the *Cæsars*) makes of our mony eighty three pound six shillings eight pence.

An Extract of a Letter containing new Observations upon the fore-alledged Testimony.

THe distinction introduced by the Grammarians betwixt *Sestertii* and *Sestertia*, is not alwayes observed by Classical Authors: and so in *Varro*'s words—*dena millia Sestertia*—— signifieth no more than—*decies milla nummi Sestertii*—---that is in English mony, reckoning the Sestertius at two pence sterling, (*id quod præter propter est verum ejus pretium*) about fourscore and three pound sterling, a very fair yearly Revenue to be got out of one Acre of ground, and therefore well worth the while, to be alledged by *Varro*, for to encourage men by this example to the keeping of Bees. If I were sure to get so much by it, I would soon turn a Bee-keeper, which I have a great mind to doe however before I dye; and therefore pray as many Secrets concerning these pretty Creatures, as possible you can attain unto; and for your reward, I promise you a good proportion of Honey and Wax out of my first Crop.

An Experiment of the Generation of Bees, practised by that great Husbandman of Cornwell, *Old Mr.* Carew *of* Anthony.

TAke a Calf, or rather a Sturk (or Steer) of a year old, about the latter end of *Aprill*, bury it eight or ten dayes, till it begin to putrifie and corrupt; then take it forth of the earth, and opening it, lay it under some hedge, or wall, where it may be most subject to the Sun, by the heat whereof it will (a great part of it) turn into Maggets, which (without any other care) will live upon the remainder of the corruption. After a while, when they begin to have wings, the whole putrified carcasse would be carried to a place prepared, where the Hives stand ready, to which, being perfumed with Honey and sweet hearbs, the Maggets (after they have received their wings) will resort. The Gentleman in *Cornwell*, that practised this Experiment, used Hogsheads,

Hogsheads, or bigger Wine Casks, instead of Hives, and the practise of the Bee being to spend the first part of the Summer in filling the upper part of the Cask, and so still to work downwards: the Gentlemans usuall custome was (through a door in the upper part of the Cask) to take out what Honey he wanted, without any disturbance to the Bees, whose work and abode then was in the lower part of the Cask.

Dr. Arnold Boate's *Observations upon the Experiment of the Generation of Bees.*

I Did ever think that the Generation of Bees out of the carcass of a dead Calf, given us by divers of the Ancients, but most amply and elegantly by *Virgil* in the fourth Book of his *Georgicks*, had been a fiction, but am glad to find the contrary by your Letter, which confirmed the same out of Modern and English Experience. And I would as little have thought, that Bees would have wrought in such vast Hives as hogsheads, whereas some of the Ancients give us a Caveat, even of the ordinary Hives, not to make them too large—*ne Apes anima despondeante ex desperatione implendi*,—least Bees should be discouraged out of a despair to fill them.

The New Bee-Hive: Or a Discourse for the right making of Bee-Hives, shewing their materials, proportion, ordering, and placing; and lastly their use and benefit. Left for a Farewell to his Native Country, by that zealous publick-hearted and learned Gentleman Thomas Brown *Dr. in Divinity, and of the Civill Law.*

IT is clear from many good Authors, that the Ancients made a constant Revenue of their Bees without killing them at any time, and that this so profitable Government of Bees is now utterly lost, is too much apparent from the common practise of all Nations at this day, who generally kill the Bees to take the Honey. If by any conjecture or comparing one thing with another, we may be able to find out a meanes to preserve Bees,

and yet receive a constant and liberall benefit by them, is the subject of this following Discourse.

Although the History of Bees hath been largely handled, even to curiosity, yet the principal part of it, concerning their Preservation, so as to raise a constant Revenue by them, hath not been so clearly set down, as the importance thereof deserveth, seeing that hereupon dependeth the whole businesse of a Bee-master; for from the multitude of Bees commeth the great increase of Honey, and the plenty of Honey is the chief Meanes to increase your Bees, which we shall easily and certainly doe, if we rightly understand and practise the naturall way of ordering them. This task at your intreaty I have adventured upon, whether I have performed it so fully and clearly as I seem to my self to understand it, the successe will judge.

For the preserving of Bees then, it is of absolute necessity, that they be abundantly provided of food, which in Summer your Garden and the neighbouring Fields must afford, for the Winter they will furnish themselves; also that they be largely, conveniently, and cleanly housed, which two things rightly practised will perform what we desire.

I take it for a certain truth, that Bees doe never forsake the place of their breeding, so long as it is cleanly and large enough for them, and that accordingly in greatest company they prosper best, as frequent experience proveth, in such places, where they have chosen themselves dwellings in the bodies of great hollow trees, in which have been found combs full of Honey wrought down six or eight foot long, as also between the beames and floonings of houses with the like increase, which in all probability could not be done by the labour of any one swarm, though of the greatest numbers, so that of necessity there must have been the increase of some yeares Bees, to bring together so great a masse of Honey, and it is truly observed, that the old and young Bees doe live quietly in the same Hive, as did the families in the old world, renewing themselves from year to year. If I shall shew you the way to accomplish this, I have done what I undertook; upon these two Maximes lieth the foundation of all I have to say, that Bees will not leave their place of breeding, but for want of room, or some annoiance by noise or ill smells: that in

all

all their workings they move downwards, if the place hinder them not. According to these two Rules, your onely care is, to make your Hives of such a fashion, as doth naturally and necessarily agree with, and help forward this design, and this can be no other than flat, as well at the top, as at the bottome, both ends of an equall breadth to a hair, in all the Hives you make, so that they may be easily set one upon another, as many as you shall see necessary for your purpose, though in some places they make them square of four boards, yet because the round Figure is the most perfect, I rather choose it. For the right making of your Hives, I shall shew you their materials, proportion, ordering and placing; and lastly their use and benefit. You may make them, and that will be the best, of such empty Cask, as hath had in it Honey, Muskadine, Canarie, or Malaga wine, according as you have opportunitie, because these vessels, being already so well seasoned, will not easily loose their savour, and will the better invite the Bees, both to come, and to remain in them.

For their Proportion I would have A. B. every Hive to contain a just bushell within the work, the breadth of it to be a third part more than the height, that so it may stand the surer headed, but at one end, which must be C. the upper part of it, in the midst of that head, a round hole D. three or four inches wide, made very smooth, the Hives A. B. must be all of a wideness from the top to the bottome, otherwise the Combs will not come out without breaking; six E. broad hoops will be sufficient, two in the midst, and two at each end, the lowest hoop must be set a large inch from the end of the vessell, leaving so much of it bare, which part must be exceeding smooth and strong, which bare place F. should be covered with a very thin hoop of Iron or brasse for its greater strength, and on the fore side of it, three in the midst for the great Bees, and six smaller on each side for the lesser, for there, and there onely it may receive offence, the uppermost hoop must be somewhat stronger and broader than the rest by a full inch, and so set on that it may stand out a full inch further than the end of the vessell, thereby leaving sufficient and fit space to set the lower part F. of another vessel fast into it as into a box, so close, that no air can come in, that it may not be moved.

And

And becauſe Bees cannot conveniently work in ſuch a void ſpace without ſome ſupport for their combs, the fitteſt that I can think on, may be made in imitation of ſuch frames, as Gardiners uſe for their Gilliflowres, compoſed of three or four very ſmall hoops, and as many ſide poſts of Fir, with ſome croſſe barres at the top, and in the middle to ſtay the Combs, and that theſe may not be ſhaken nor moved, in the bare ſpace at the bottom of the veſſell, bore two holes, one oppoſite to the other, through the veſſell and the frame, and ſo faſten them together.

And for the more eaſie and ſafe removing of your Hives, either to ſee in what eſtate they be, or to take away ſuch as be full of Honey and empty of Bees, you muſt ſet upon every Hive two G. ſuch iron handles as are uſually upon buſhels, and ſo you may command them at your pleaſure. And for the great hole D. in the top of the Hive, you muſt make a cover H. with a ſhoulder and a handle, to ſtop it ſo cloſe, that no air may come in. Your Hives A. B. being thus I. C. D. E. K. G. H. made, you muſt order them as followeth. I will ſuppoſe you have at leaſt A. one Hive of old Bees, at the beginning of the year, take B. one of your new Hives, and ſweeten both it and the frame very curiouſly, and faſten them together, ſet this Hive B. where you mean your Bees ſhall ſtand, leaving the hole D. at the top open, then take A. your old Hive of Bees, and cut away the skirts of it, as much as conveniently you may, to the very Combs, the neerer the better, and make a new door to it, and ſet it upon B. the new Hive, within the compaſſe of E. the hoop. And becauſe in the Bees working down into the lower Hive, it is probable that the Combs of the two Hives will hang together, and ſo be troubleſome to part them, to prevent this inconvenience, lay a falſe bottom, with a hole in it, upon the top of the lower Hive, cloſe to the top of the lower Hive, and make it faſt.

Your Hives being thus placed, your Bees, either for the ſweetneſſe in the new Hive B. or for want of room in the old, will make all haſte to work down into B. the new, and ſo in a ſhort time leave A. the old full of Honey and empty of Bees, both the old ſtock, and their increaſe, going down, working and abiding in B. the new Hive, whereby you ſhall have opportunity, when

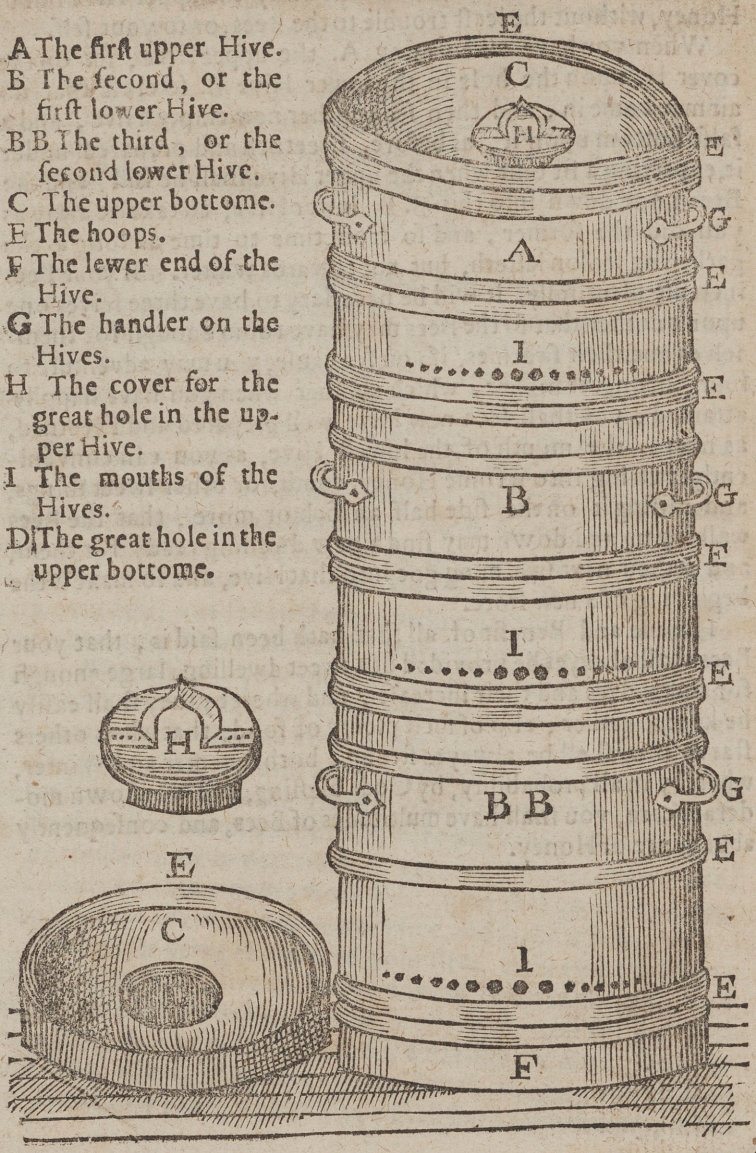
you

you see it most convenient, to take away the upper Hive full of Honey, without the least trouble to the Bees, or to your self.

When you have taken away A. the upper Hive, set on the cover H. upon the hole in the lower Hive B. so close that no air may come in, and then set another new empty Hive, and a false bottom upon it, as before, sweetned and prepared under it, expecting a fit time when the upper Hive shall be full, and the Bees gone down into this B. B lower Hive, to take it away as you did the former, and so from time to time as long as the gathering season lasteth, but not towards winter. If your Bees increase plentifully, it will be necessary to have three Hives one upon another, that so the Bees may have room enough for themselves and their swarmes, if you see cause, you may adventure to four, but never higher, which number when you have happily attained, you shall set a new Hive well prepared and sweetned, as neer I. the mouth of the lowest Hive, as you can conveniently, putting into it some Honey-comb, or other sweet things, and raising it on the side half an inch or more, that the Bees walking up and down may find a new dwelling ready for them, and at their next swarming goe into that Hive, and so make it the beginning of a new store.

The use and Benefit of all that hath been said is, that your Bees shall alwayes be provided of a sweet dwelling, large enough for themselves and their increase, and whereby they shall easily be kept together, also of such plenty of food, that when others starve they shall be alwayes strong, both Summer and Winter, whereby in all probability, by Gods blessing, and your own moderate care, you shall have multitudes of Bees, and consequently abundance of Honey.

A The first upper Hive.
B The second, or the first lower Hive.
B B The third, or the second lower Hive.
C The upper bottome.
E The hoops.
F The lower end of the Hive.
G The handler on the Hives.
H The cover for the great hole in the upper Hive.
I The mouths of the Hives.
D The great hole in the upper bottome.



A Querie upon the description of Dr. Brown's *new invented Bee-Hive.*

WHether the square Figure may not prove the best, in that there may better be placed a bill or drawer in the bottome of the Hive, into which (being drawn forth) there may from time to time be food laid for any particular Hive, without any disturbance to or from the rest of the Hives, where every particular Hive may (if occasion require) shut up and feed by it self, which in the ordering of Bees may prove many times of good concernment.

A Letter discovering a new kind of excellent food for Bees.

SIR, Being much indebted to you for the gift of your Ltgacie, and other choice pieces, and understanding that you are about another of the like nature, which you intend to publish. I thought good in the mean time (till occasion prompt some other meanes to serve you) to impart unto you this notable Secret, which I had from an old *Germane* Captain concerning Bees, that by long experience the Planting of Anise neer them proved the best meanes for multiplying and keeping of them, as also for their breeding of great store of Honey. That the Hearb being taken, and the inside of the Hives rubbed therewith, causeth great multitudes of Bees to etner, and become close retainers to those Hives, which ought to be placed directly against the Sun, so that the Sun-beames fall just into the Orifices of them. That the feeding upon this plant will cause each Stock to engender and thrust out three young ones in one year, within which space they doe else not use to doe so above once. That against the time of their thrusting forth, other Hives ought to be placed next to those from whence they thrust forth, which, as also the way leading to the Orifices, are to be rubbed with the Anise in such sort, that the juyce of the Hearb may come forth and stick thereunto, and the young Stocks that come forth from the old, will certainly enter into those, and not repair any where else. But in case that upon the neglect any be swarved

forth, and settled unto some tree, the fault may be amended by rubbing the inside of the new Hive with Anise, and holding it on the top of a long pearch unto the Bees, who will enter thereinto of themselves as soon as they scent the sweetnesse of the Anise.

The aboveſaid Captain related, that a Baron in *Austria* so thrived by this secret, that he furnished many Countries with Honey and Wax, and thereby abundantly increaseth his wealth and revenue. This I thought to hand unto the publick by your meanes, resting

Sir, your most affectionate to serve you F. H.

SIR,

I pray pardon the rudenesse of my language, and to surrogate that which may better abide the touch-stone of publick view. For my being continually called upon will not give me leave to doe it better.

An Extract of a Letter concerning this New kind of food for Bees.

ABout the Secret concerning Bees, on which you desire my judgement, I can say nothing else, but that it must be referred to Experience, whereby if it be confirmed (as indeed I doe think that very likely) I shall be extreamly beholding to you for it, and I may chance to make great use of it one day, beseeching you heartily, that when ever any of the like shall come to your hands, you would be pleased to impart the same unto me.

Another Extract of a Letter upon the same Subject.

MOst of those Authors that write of the nature and government of Bees, of whom I have the matter of a dozen here, name sundry Hearbs, to which the Bees have a particular liking, and divers others, that are good in sundry respects to be neer the Hives, but not one of them all doth name Anise, in either

of

of those two Classes, as my inquiry (for which I had no time when I wrote to you about that matter first) hath taught me; so as that Secret which you imparted unto me concerning the same (a most excellent one indeed if confirmed by sure experience) is altogether new, and not borrowed from ancient Writers, as you may see hereby.

How Anise may be got to grow in England, *is taught in that excellent Book, called,* The Garden of Eden, *as followeth.*

SOwe English Annise-seeds, when the Moon is at the full, in *February*, or any time between the full and the change: if frosts will not suffer you to take the full Moon, hatch them into the ground with a rake stricken thick upon them; then strew new horse-dung thinly upon the ground, to defend the seeds from the frost. —— These will ripen about *Bartholomew-tide*; then respecting the Moon, as before, sowe again, and these seeds will be ripe sooner than those which were sown in *February*. These seeds will also come up well, being self sown, onely break up the ground about them when they begin to ripen. That ground which you would sowe in *February*, break up about *Michaelmas*; let it lie and crumble all the winter, then when you mean to sowe, stir it up again, that it may be mellow, for the mellower the better. A black rich mellow ground is best, and they like well in a rich dunged ground. Proved by S.

A Translate of a Letter written in High-Dutch, communicating a Secret for the better ord.ring and preserving of Bees, practised beyond the Seas.

SIR, I give you many thanks for that direction about Bees, but I cannot perceive, how by that way we may prevent their swarming, or the trouble of hiving them. Nor doth that way avoid the vulgar errour of destroying the best Bees for their Honey.

To remedy all these and many other inconveniences, I have formerly sought an unusuall way, and in practise have found it good and profitable.

I caused Hives of glasse to be made, and covered them with wood; in which Covers I made windowes to be opened when I list, which served me for the better considering of their nature, but afforded me no help in the foresaid inconvenience, for such I account them, though I see your man be of a contrary opinion, speaking of often swarming, as a thing very advantageous. It is true, the more swarmes you have, the greater is the number of Hives in your Bee-garden, but the stocks are so much the weaker, especially every metropolitan stock, out of which his three or four Swarmes issued: which consideration gave occasion to that precept, given heretofore by experienced Bee-masters, not to suffer any stock to swarm above twice in a year; but rather to prevent it, by giving the Bees more room, which is done by setting the Bee-hive some inches higher from the bench or stool upon which they stand.

That swarming weakeneth the first stocks, is manifest to any one that considereth, that for the production and breeding of the young Bees, there is in every Hive a great number of attendants, somewhat larger than the Bees (we call them Drones) which are fed by the labours of the Bees, as long as they prepare for swarming; but as soon as the Bees resolve to send out no more Colonies, they fall upon the Drones and kill them. The young Bees are also kept idle till their General be ready, and the whole Army be fit to march out all together for a new plantation. The oftner that such swarmes issue out of a stock of Bees, the more is the dammage and charge that it suffers from these Drones and young Bees: All which cost and charges are spared in my way, so that my Bees never intending to swarme, had so much the more provision for bad weather and winter, and did so much the sooner set their young ones to work for themselves, and to earn their own meat, as having no pretence to be kept idle,

Secondly, In the common way it is so hard to keep Bees from flying away in swarming time, that the most diligent watchers of them doe now and then lose a Swarm: But in my way of ordering them such watching is unnecessary; for my Bees never fly away, because I prevent all occasions of swarming: By which meanes they are also kept from breeding of Drones, and

new

new Master-Bees, or Generals; and their young Bees, as soon as they can fly, are set to work among their Elders.

Thirdly, I never needed to kill any of my Bees, and yet I could share with them in the Honey. It was not unusuall with me to make a whole barrel of Honey and Wax out of one Stock or Hive. And besides all these conveniences, my Bees were farre better secured and defended from excessive heat and cold, from vermine, theeves, and all other their troublers and enemies. They had also this accommodation, that when they were laden they went downward, but clambered upward when they were unladen, whereas the contrary is necessary in the common-way.

I make no question, but that by this time you long to hear what course I took with them; nor shall I be nice in communicating it, though it cost me above two hundred Rix dollers. But if you were here, I could farre more easily shew it, than I can now find words to expresse it well in writing, especially thus in a Letter.

My Bee-hives did not stand upright after the usual manner, but lay upon two long poles or rails within my house, in a Garret, close under the Roof, where the Bees could creep in and out under the tiles. The close end of the Hive touched the tiles of the roof. In the upper part of each Hive I did cut a hole for the Bees to goe in and out. The wide end of the Hive commonly stands clapt down upon some plank, but in mine it was shut up with a bottom made of straw, pinned to it on every side with wooden skewets. And by the like meanes I could adjoyn straw-hoops of what breadth I pleased, and so lengthen any of my Hives as often as need was, so that they never swarmed, though their number increased so much, that by several additions a Hive became two or three yards long.

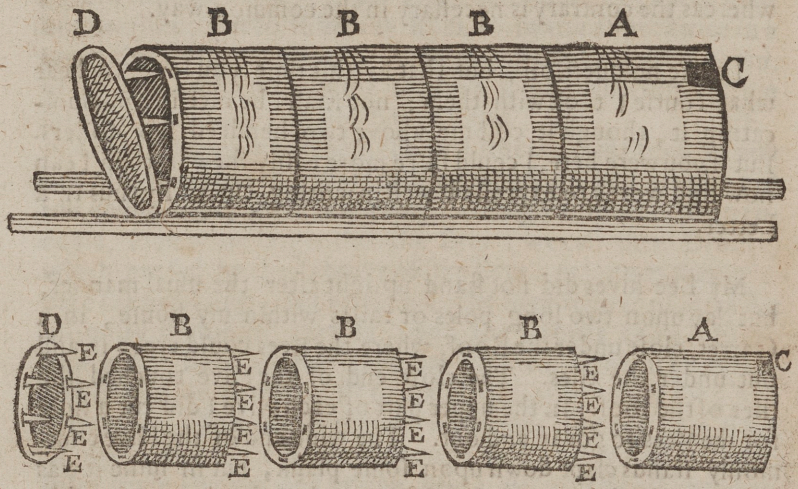
The way of taking their Honey from them was thus; I unpinned the wide end of a Hive, and by burning linnen rags I smoaked up the Bees thence toward the close end of the Hive; and then I might freely take away the prolongers or additional hoops one after another, till I thought the Bees could not well spare any more Honey.

This

This slight description may make it seem a small matter to those that consider not, that all the aforesaid conveniences will undoubtedly follow it.

Hereafter I may perhaps expresse it more fully, when I have more leisure to write; especially if my affairs would permit me to come to you to confer at large of this, &c.

Another Authors description of the said Secret.



A A common Bee-hive.
B A prolonger to lengthen or eeke out the Hive withall.
C A hole cut in the upper end of the Hive A.
D A bottom or dore to shut up the Hive, whether it be single as A, or lengthened as A B B.
E The wooden pins in B and D for the joyning of them to the ends of A or B.

SIR, I here send you the description of my long Bee-hives expressed in picture: Wherein (A) is a common Bee-hive, no

not ſtanding, as the uſuall manner is, but laid along upon one ſide. In the upper part of the Hive I cut a round or four cornerd hole, through which the Bees may paſſe in and out, here marked with C. In the placing of the Hive you may turn that hole downward if you will, but I turn it alwayes upward, that the Bees, when they are laden, may rather goe downward than upward. Beſides, if I turn it not upwards I cannot well ſet it cloſe to any hole, left for the Bees entrance, under the tiles in the roof of a Garret, which is a farre ſurer way than after the uſuall manner, to leave them in a Garden, expoſed to theeves, vermin, and diſtempers of weather. Where the roof is inconvenient, I uſe to make a hole in the upright wall of a Garret, and ſet the Hive cloſe up againſt the wall, with a hole in its head preciſely anſwering to that hole in the wall.

The open end I ſhut up with a bottom made of ſtraw, as you ſee repreſented at D, which may be opened eaſily, and yet ſhuts cloſe and firm by the help of thoſe wooden pins here marked with E.

When I perceive that my Bees have neer filled their Hive, I take off that Shutter D, and ſet on a Prolonger, like the Hive, but that it hath no head, ſuch as are here marked with B, and then ſhut it up, as before, with that ſtraw door D. Thus I may add as many Continuators as I pleaſe, ſhutting cloſe up to one another, alwayes cloſing the laſt with D

Whenſoever I intend to take ſome Hony from the Bees, I provide linnen rags, wherewith I make a ſmoak, and let it into the Hive, by pulling away the door D, from whence the Bees are driven by the ſmoak toward their ſmall entrance C, ſo that I may ſafely take away as many prolongers as I think good, and put a freſh one in the place, ſhutting it up with the door D.

A Phyloſophicall Letter, treating of many other Secrets and Experiments for generall Riches and Profits, beſides thoſe ariſing from Bees.

IN purſuance of your requeſt, and performance of my promiſe, I ſhall, according to what I may, indeavour to anſwer your deſire, knowing your ſincere Zeal for, and care of the Publick.

Truly

Truly Sir, I should very hardly have entred the stage, had it not been out of that inclination I have to serve you, who neglecting all private interests, doe wholly spend your self in labouring to profit others, who how far they may take notice of your pious and sincere endeavours herein I know not, but confidently perswade my self, that your labour will not be lost as to future Ages, who will assuredly take notice of your pains and care, and will esteem your labour accordingly.

I have read several Pieces, by your self published, both lately and formerly, and those discovering, not onely Divine and Spiritual, but also Humane and Temporal Mysteries. As to the first sort of your Discoveries, I hope there is none so unprincipled in Christianity, but must and will confesse, that by such Talent-improving Servants much will redound to the advantage of the Lord the Creditor, and for the edification of many in the wayes of Righteousnesse. But as to the later, perhaps the ignorance or perverseneſſe of the times may impute that to folly, which the ripest of the Imputers could hardly equall with solid and reall wisdom, yet you may resolve, that the time will be, when your undertakings herein will more earnestly be prized, for I perswade my self, and that not without good ground, *That it is not now long before the time shall come, when Ingenuities of all kind shall more and more flourish, when the envy of Artists shall cease, who shall not then be jealous, least others with a dry finger should attain to such things by bare reading, which they in finding out have tryed so many wearisome Experiments*, which in mine opinion is (though I confesse God by this meanes doth keep obscured, that which he in his justice judges the ungrateful world at present unworthy of) but a meer humane conceit, and full of fleshly fragility, for considering the many ripe wits which are in the world, *If a man, who hath attained to any measure of reall discovery, should as freely impart the same to such, of whose sincerity he is assured, and withall such, who with himself are daily searchers into the secrets of Nature, I am confident, that by this joynt improvement of their utmost ability, more in some few yeares would be found out, then by any one single man could be attained, though he should live to a very great age.*

There-

Therefore Sir, I cannot but judicially honour your desires of vindicating what ever excellent you can meet with, from the dark cloud of obscurity, that so the Publick may by this meanes reap the fruit of that seed, being thus scattered, which, if stifled under a clod, would have been for ever unuseful. Besides many other useful Pieces, those which more neerly concern us here in *England*, are your two Books of Husbandry, the one shewing us our Defects here in *England*, the other the *Braband* Husbandry, which with Gods blessing I hope will redound to the filling of our Pastures with Cattle, our Gardens with all sorts of Roots and Hearbs, our Garners with store of Grain, to the wonderful good of this place. Next your Design for Plenty, in the universal planting of fruit trees, to which two I hear you are adding a third Treatise concerning Bees. These three Treatises concern our good and welfare so neerly, that I can but wish them as happily embraced, as ominously offered. For indeed if they were put in practise, the Advantage which the Common-wealth would reap therein, is beyond estimation: for first of all the plenty of food would soon cheer the mind of those, who through the scarcity thereof, and other necessities, are now likely to famish, of which the overplus would not onely provide Cloths, the other staffe of life, which necessitie craveth, but also produce several staple Commodities, by the which Conveniency, yea, superfluity it self would be maintained among those, who for present are destitute of Necessaries.

For to give you a tast herein, if Lands were improved for Hay and Roots, as the *Brabant* Husbandry doth cheifly insinuate, that which at present is waste, and of little value, would yeild both Roots for mans nourishment, and Hay for fodder for Cattel, by which a double benefit would arise: First, the increase of Cattel, and with them of Butter, Cheese, Bees, &c. Secondly, Land by this improvement would be brought to be of farre greater value, for the like, or any other imployment for future. To these adde the Oyle, which the Seeds of Roots would produce, if in quantity sown. And then the Roots themselves, with Graines, Turnip-tops, and the like method, as in the large Epistle is taught, with the Hay, would be enough (if not to spare) to feed Cattel that are to be fatted, Milch-Cowes, and

labouring beasts, so would the Pastures be the lesse burdened, onely with Sheep and other dry Kine; nor should we be so driven in cold weather for the keeping of Cattel, which by this meanes would not onely be in good plight, but even fat in the midst of Winter: Then the abundance of all sort of Grain, which would be in these Nations with the Fruits and Honey, would be cast upon us as a superfluous inriching, as if the Bounty of the most High were not content to make us happy, but of all other Nations most wealthy: For besides the making of Bread and Beer out of Grain, upon which account it is a thing prized of most Nations that are civilized, and the ordinary and known use of Fruits, I know, and that upon most infallible grounds, that by the abundance of these we might better our Being, beyond what at first thoughts can be apprehended.

Leaving then all known Mechanical Uses of these Commodities, with the value of them on that account, as they are (*in specie*) I shall hint some other Applications of them, without considerable charge or trouble, by which meanes a most incredible advantage may redound to him, who hath opportunity, leisure, and list to experiment. And first as to the making of Wines: And secondly of Strong Waters, or Spirits; of which how much is imported into this Nation annually, it is beyond my reach to compute.

Whereas, if instead of having these brought into us, we were able, besides our own store, to export the like, or farre greater quantity, none will deny, but that this Art would indeed be (as to the benefit from it redounding) invaluable. *I say* then, *and can demonstrate, that out of all Graines which are of a mealy substance, as also out of all Seeds of the like nature (not oyly) may be made excellent Strong Waters*, or Aqua vitæ; *as also out of all Fruits, Plums, Berries, or Roots; that out of Berries, Fruits and Roots is more mild, but by Grain malted and Honey it may be quickned. There are of inferior sort of Graines, as Rye, Oates, Pease, and the like, which handled as Barly, untill it sprout Corn, need not then for this work be dryed, but beaten and moisted with its own liquor, and soundly fermented, and will so yeild a monstrous increase. Out of one bushel of good Pease, I know, will come of Spirit, at the least two gallons or more, which will be as strong as the strongest Annise-seed-*

watey

water usually sold in London: *This I know is the least, and is done without malting.*

Now to these adde your drossie Honey, that, to wit, which comes not forth without squeezing the Combs, and you shall encrease your quantity abundantly; so then *by the meanes of Honey, Graines and Fruits, we shall not need so much to fetch Canary or Malago Wines from the Spanish Territories, nor White or Rhenish Wines from the French and Germane Coast*, so to inrich them with our Commodities, for which we receive but a pallate-pleasing Juyce, which nature craves not for necessity, nay the greatest part thereof is infused in sinful superfluity, bearing the greater price, because farre fetcht; whereas the Nations, with whom Wine is made, use farre lesse of it than we who buy it at Rack rates, so that it is a Proverb, *Hispanus rarò ebrius*, The *Spaniard* is seldome drunk: The more is it both our sin and shame, who oft abuse that good Creature to drunkennesse; whereas if it were once become (as its easily so to be made) a domestick Commodity, no man then would want it for his necessary use, and by the reason of its commonnesse, the price of it would be brought farre lower, and by consequence the request it finds among the sipping Gallants of our time would abate; so that this benefit at least would redound, that besides the moderation which would ensue of that Excise in drinking (which now alas to our shame is in use among us) we should be able to send forth in considerable quantity that very Commodity, the Import whereof doth stand this Nation, now yearly, in an incomputable sum of money, besides the support of several families by the use of them in Specie, which alone were enough to make the abundance thereof to us, not onely acceptable, but also desirable,

As for the use of Spirits I need not to mention them, since utterance, I suppose, presents it self yearly to this Nation of as much as it can spare, and more, I suppose, could be vended, if it might be had. Yet one thing I may speak as to that particular: It is known, that Fish is no small part of the traffique of this Nation, besides that which is used among our selves for our own spending, of which (especially Cod-fish the principal Merchantable Fish that is sold) is taken at the banks of New-found Land, and New *England*. Now what quantities of Spirits are spent

among the Fishing-Companies in New and Old *England*? I suppose many know better than I can Inform them, who for the most part are supplied with Dutch or French Brandy, those Nations eating, as it were, the Bread out of our mouths, by which meanes the wages of the painful Fisherman is, for the most part, at the winding up pocketted by Strangers, whereasif we were able to furnish the same Commodity at like or lower price, it would be to us no small annual profit, since, in such like Trade, the Fisherman consumes, for the most part, one half of his yearly earnings.

But I shall leave the managing of Commodities to those who are conversant in such Employments, at present bounding my self with this, *Ne sutor ultra Crepidam*: It is enough for me to shew how Commodities may be raised, and those domestick, with inconsiderable paines and trouble, but for the improvement of them, it is good I should leave that task to such, who professedly take upon them the charge of such matters.

But while I thus swerve from my professed theme, which is to give you (according to that Observation that I have taken) an account of Bees; give me leave to hint one thing, which (in my opinion) is the Master-piece of whatsoever you have waded in. I cannot say that you are the Author of it, since I have read many Overtures made of and concerning that Subject, by others, yet I know that your self are none of the least drivers on of that design, namely, the Advancing of Credit, so as to make Bills Currant in payment, to the wonderful encrease of Trading, to which I may also adde your Office of Publique Addresse, both which Enterprizes (if not unseasonable mercies at present) I hope the Lord will give this Nation to enjoy,

But as concerning our present matter, which at this time I chiefly intend, namely, concerning Bees, I understand from you, that your chief desire to be informed concerning them, is first, How they may be engendred? Secondly, How encreased? and thirdly, How inriched with Wax and Honey?

For the first, The truth is, I have read in some Authors of their engendering out of dead Kine, fermented with the falling dew. Some think, that out of any kind of beast Bees may be produced, and doe conclude, that the Bees which bestowed their Honey on

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the carcasse of the Lion, slain by *Samson*, were of this nature, and bred out of that savage Creature; yet must I confesse, that I never yet saw the Experiment of Bees engendred in or from any dead Carcasse, though I have known several sorts of dead Creatures both open, and covered with leaves, lightly exposed to the continual dewes, yet never could I take notice of any such procreation. And that out of Kine, either strangled, or otherwise dying, and so lying abroad, exposed to the influence of the Heavens, Bees naturally will not spring, I am induced: For that in the Summer Islands, where I was born, I never yet saw one Bee, except those of a kind called Humble Bees, where notwithstanding, to my knowledge, divers Cattle both younger and older, have (perishing by mischance, as it oft falls out there, that the very heat of the noon-Sun in Summer kills Cattle if not removed into the shade) lyen in the open fields till they have rotted, and have not a night scarce wanted the dew, in which Maggots and Wormes have bred, but no Bees, which if they were so to be bred, I suppose would in lesse than fourty yeares have been seen in those Islands, in which I never saw any, though I was naturally a great Observer of Insects there, where I noted Waspes, but no Honey making Bees. Nor is it to be thought, that the Climate is averse to the Generation of Insects, which it there produceth of other kinds as plentifully, if not more than many other places, in which Bees are.

Also my ingendred Curiosity was so great, that I took the pain to observe and collect the Generation of several Insects, with their various mutations from kind to kind, sparing no diligent travel that might benefit me herein. For so soon as I began to read a little in Philosophy, I took great content in these Contemplations, which after in New *England* I as carefully noted. In the Summer Islands I found, that in Rain-water kept in wooden Troughs (especially where the Sun at some time of the day shineth on it) there would in time gather a sedimen of muddy matter to the bottome, black and slimy, out of which would breed at the bottom, crawling long ill-favoured Wormes, with many feet: these Wormes growing bigger and bigger would swim and play together, and engender sexually, till at last growing more slow, they would at length lose almost all

motion,

motion, at last coming to the top of the water, would by the legs hang neer the superficies, where in few dayes, opening the back, out of them proceeds a Fly, which crawling out of the water, is for a day or two tender, after able to fly, which Fly, after a time casting its skin, becomes another creeping Insect, without wings, and of it proceeds another Fly, farre different from the former. So in the ground, I have often under stones or tufts of grasse found tender Wormes, which are naturally in time of their own accord incrusted, and so lying a space, at length break, out of which comes a great Butter-fly, which layeth her Eggs on the Orange tender leaves, where the dew hatcheth them into Wormes, which live on the leaves, and if touched send forth long red hornes; these at length, hanging to the under part of a bough, are incrusted, and after a long death turn into the same kind of Butterfly, which before came out of the Earth.

Another sort of Wormes, ingendred by the Celestial influences in the Earth, being incrusted, proves a singing Fly, which after its season, cleaving to a Tree, casteth its skin, and of a Fly becometh a creeping sceptile, and so liveth a long time, till about the season of the year when that Fly cometh again. This creeping thing on some tree or other for a time is almost without motion, at last bursting insunder in the back, out of it comes the like singing Fly as came before out of the first Worm, which was bred in the earth.

Many such like Generations of Wormes in the Earth, and of crawling Creatures in the Waters, which after turn into Flies, and so again into other husky Wormes without motion, and from them to other flying Insects. I might speak largely, were it not besides my proposed intent and scope at present.

A third very anomalous Generation, which I have noted, is of a sort of stinging Flies out of rotten Trees: these, in the Summer Islands, I have observed out of the rotting Palmeto, and in New *England* I have seen the same in rotten Poplar and Birch: In which a man may at one time see some, like to a tender Spermatical milk, enclosed in a most tender skin, others like to a white Maggot, with a little motion, others now almost shaped like a Fly, others full formed, and able to crawle, others ready to come forth, and in a short time after to fly.

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The Generations of Beetles, Dorres, &c. I have also diligently enquired into, and find, that under stone hedges, where dunghils are usually made of Rubbish, they doe chiefly proceed, which some sort of Sea shell-fish, buried in the Earth, doe also produce the same in kind and fashion with the former. Yet, as I said, I never yet could experimentally find any rise of Bees from putrefaction, though by me, for curiosity sake, oft attempted, and that with the bloud, also with the flesh of Kine, such as by accident perishing, I could procure part of them for tryall sake; this I have kept, some openly exposed to the dew, others covered with Rubbish (as for the Generation of other Insects) other while defended with green leaves and straw, and so buried in the Earth, others covered with earth immediately without any defence from the same, in which variety of operations, as I had variety of successe, at various seasons of the year, so never did the event answer the end, for which I imployed this industrious inquiry. If any Gentleman, that hath on his own experience tried this manner of production of Bees, please to impart his method, I shall be unto him really thankful, and requite his communication perhaps with as acceptable a discovery.

Insects then in my opinion, is, as it were, Natures recreation, which she out of the fracid ferment of putrifying Bodies doth form, in which as there is singular and rare variety, so they are intended either as blessings or scourges to Man. The Bee, the Silkworm, the Cochmeel, how greatly profitable to Mankind they have been I need not repeat, nay most Insects of a shelly or scaly nature, being very excellent in medicinal qualities. I think then, that our sloth is very great, in that we neglect the inquiry into this particular. I shall a little touch, and perhaps not impertinently here. In the Summer Islands there is a sort of Spider, that is very large, and of admirable gay colours. yellowish, blackish, greenish, and reddish, so intermixed, that it makes the Creature very delectable to look on; these in great multitudes are there, who live abroad in the open fields, spinning their webbs from tree to tree of a vast bigneſſe, to catch Flies in, on the which they prey: their webbs are yellow, and most pure Silk of which one Maid for tryall knit a pair of Gloves, which prove

in

in wearing no whit inferiour to the best Silk of the Silk worm. Now if these Spiders were so kept, as an ingenions man might easily invent, *they by feeding kept in good plight*, might be made to spin quantity enough, for as much as in few houres they will spin a large web, if their old one be taken away, else they mind onely their prey. But the triall of what may be done in this, I leave to others who may have opportunity; this I onely insert here to shew, that not the Silk-worm onely yeeldeth Silk, which is common to this Spider with them, and that of the Spider nothing inferiour to the Silk which the Worm spinneth.

Again the Cochmeel, which is so rich a Commodity, cometh out of a fruit called the Indian Fig or prickled Pear, which as yet none of our Nation have attempted to make, which is the cause that die is so scarce, although *in all the Summer Ilands the Tree bearing that fruit is most plentifull, and the generation of that Insect as easie as may be*, if but attempted with ingenuity. The leaf is of a thick slimy nature, the fruit full of seeds and bloud-red, very wholsome, and hath this property, that it passeth strait to the urine retaining its colour, and is rejected by urine as red well nigh as it was taken in. *This same fruit is not of the like tincture with the Insects proceeding from it, but give a colour almost like to Brasiletto wood, which in the fire in a few dayes perisheth. But the Insect ingendred of this fruit is of a most permanent Tincture, I for curiosity examined other Vegetables which were of Tincture, and found them all to yeeld Insects of the like tincture, with that out of which they were procreated.*

In particular, and with much Curiosity, I examined Shoomake Berries, which have a red out-side, like to the furre of Velvet, in small red graines, but the inner kernel not answering the out-side in colour, I found the Insects not considerably tincted red, yet in Medicinall Operations by farre surpassing the virtue of the Bare Berries, for they had a peculiar diccretick quality.

There is a Berry also groweth *in great quantity*, *both in the Summer Ilands and in New* England, *which makes me to conceive, that it would also grow here*: It is with them of the Summer Ilands commonly called Redweed, the virtue of it is purgative upwards and downwards strongly, the Berry is as red as the prickled Pear, and gives much the like tincture. This Berry I

intended

intended to prepare for Medicinal uses, but by occasion my Design in that being frustrated, I assayed to see what manner of Insects it would yeeld, and there came forth first Wormes, which growing husky, with small bumps where the head or upper part lay (which is easily distinguished in such Insects) I perceived thereby it would produce a Fly, which accordingly it did, which was of the bigness of the Cochmeel fly, but a little longer, which grew by the same matter, out of which they were engendred, to a considerable bigness, when I taking them out, in a gentle heat in a close glasse, killed them, and dryed them, and though I have oft assayed the Cochmeel for curiosity sake, yet I could not find this, as to the point of tincture, any whit inferiour to that Insect, and as to Medicinal virtue *æqui valent*, if not exceeding the other.

And *I am confident* (though that I have not tryed) *that out of Brasiletto like Insects of the same excellent tincture may be produced, knowing experimentally, that out of any Wood-berry may, by an animantative fermentation* (if I may so speak) *be produced, first a small Worm*, which growing bigger groweth husky, and at last becomes a Fly, which being suffered to grow till it have waxed a little, then killed, represents the tincture of the Concrete whence it was produced, which then being *graduated* beyond its own nature, leaveth its dye in grain.

I have been the longer upon these kind of Insects, desiring, at least, with as much brevity as I can, to give hints of what rare Secrets are in Nature attainable: So that if any desire *the way to fix a fading Colour, consider if that Colour will hold untill the Compound may receive a ferment (for fermentation openeth the Body) after which thou shalt cause it to engender Insects, which is an easie Art:* These Insects will give thee the tincture of its Original Concrete, which will hold in grain.

Now as to Medicinal Virtues of Insects I might be very large, but I shall willingly passe them over; onely this I shall say, being desirous to try what might be done upon this account, I took Blood, and pouring the Water from the Clodds of them, by putrefaction I had great Maggots, with moisture, which consuming the moisture grew in quantity, and were in a manner dry, these I washed clean, killed them, and bruised them, and of

them had in a second putrefaction other lesse Maggots, somewhat differing from the other, and with a tolerable smell to the other; these being grown to their greatest, I washed again, killed, and so putrified them, and this a third and a fourth time I repeated, then I took them, and having first washed them, digested them (being bruised) for six weeks, and distilling them, had a Water and a yellow coloured Oyle, of the most exquisite penetrating resolving vertue that ever I knew, which I yet call *Oleum Lumbricorum Verum*; Attempting the same with livers of Beasts it succeeded in like manner.

But now to return to the History of Bees, to wit, their propagation; It is known, that if they have good Hives, with convenient shelter, and sufficient store of meat, they will encrease sufficiently. So then the main matter is to know how Bees may best be stored with Honey.

First of all, if your Design of planting of Fruit trees take effect, that alone would mightily encrease Bees, it is not to be credited what one Orchard will afford to that purpose. But because the time of the blossoming of Fruit trees lasts not long, there would be found out some fit meanes for to nourish them in the later moneths of the year; it being a Proverb, that *a Swarm of Bees in* May *is worth a Cow and a Bottle of Hay*, whereas *a Swarm in* July *is not worth a Fly*. For it is evident, that the dew which falls on the floures is that which Bees suck; though *July*, *August*, *September*, and part of *October*, are for the heat of weather, as seasonable for Bees to work in as *May*, yet in them they enrich themselves but little, because of the scarcity of Flours, Blossomes, Honeysuckles, and the like, which at that season of the year are rare.

Your Letter to me (in which is the transcript of part of an Epistle) to this end, commending the planting of Anise, doth seem very rational; first in that Anise yeilds an innumerable company of small floures (as also sweet Fennel) which if gathered in a morning, the dew on the flowers is very pleasant. The like also is on Parsly, Carroots, in their flouring, but not so pleasant or grateful to the Bees as Anise or Fennel, in regard of the sweet scent which they carry, which alone is very alluring to them. For in dew it self is a sweet Sacharine salt, which yet Bees doe

doe not so much desire, unlesse it have a *fermentall Odour*, which it acquires within the Concavity of sweet floures, as of Thime, Rosemary, Anise, or Fennel, &c. Yea, Experience it self shewes, that by the *ferment* of these the dew is transmuted, and obtaines a sweetnesse many degrees passing bare dew, yea, and a Consistence also, as appeares in Manna, Thereniabin, and the like, the falling of which I have oft and diligently noted, and find it to be materially nothing but dew, which falling on some things becomes inspissated: Yet cannot I but respect the making of Honey, as a thing peculiar to Bees, and although according to the Proverb (*& mel sibi parant vespæ*) yet in my opinion there is worthily a great difference to be acknowledged between Honey and other inspissated sweetnesses, so that neither Manna, nor any such falling congealed sweetnesse, hath the like nature as Honey, which in its Analysis more easily is apparent. I oft have with a clean linnen gathered the sweetnesse of the tops of Fennel, and wringing it out of the linnen, have tryed if or no it had the parts of Honey, but found in them a great difference, by which I learned, that Bees out of the falling dew, by a peculiar fermenting virtue, doe really transmute what they suck into Honey. Also that *Flowers within them contain a ferment, by which the dew that falls in them is converted into a thicker substance, and sweet, yet formally distinguished from Honey, which the Bees allured, both by the smell and taste, doe greedily resort to and suck, and of it load themselves*, out of which they doe separate a more fat substance, which they also transmute into Wax, with a formal transmutation.

For as much as Wax formally differs from all fatnesse in the World, so then the dew, which being collected from any Floures, will scarce yeild a twentieth part of *Caput mortuum*, being by the Bees suckt and digested into Honey, then (if distilled) will yeild neer a third part in a Coal, and the liquor that distils will be part coloured, with an exquisite sharp taste, and a fætor of Empyreum, which in the other is not so to be found. By which it appeares, that the Bee finds not his Honey made before-hand, but transmutes that which was not *H*oney into Honey, by a peculiar gift of the Creator. So by this it may be gathered, that Anise in all probability will perform what is promised of it

in regard of its fragrant scent, which is so acceptable to that working Insect. For I remember, when once upon an Experiment, I was digesting a thing with Oyle of Anise seeds in the Sun, neer an Orchard, in which were many Hives, the Bees did swarm exceedingly to the scent, but that which was digesting being of an intoxicating nature, the Bees were with it amuzed, and so by the hot Sun killed out-right, and I am confident, had I continued my digestions any considerable time, I had soon unstock nigh a dozen of Hives, so alluringis the fragancy of that scent to that Creature. Yea I have observed, that it is common to them with Waspes, to be exceedingly drawn with any eminent sweet Odour. Adde to the fragrancy of smell the excellent *sweetning ferment*, which from Anise or Fennel floures is communicated to the dew, so that to suck such clusters of Floures in a morning is almost as pleasant as to suck a Honey-combe for taste.

But the third and main excellency in Anise, is the long duration of the flouring time, which may be continued four or five moneths, sowing Anise at several times, for it is the floure onely of it, which the Bees suck on. Yea, and though sown at once, yet of Anise, Fennel, and the like, the nature is not as Apples, to floure at a peculiar time. for as much as at one time a man shall find both the floure tender, and the seed neer to its full growth, so that this hearb will afford a durable supply to the painful Bee, the seed it self being also a very good commodity.

But yet there is another way by which Bees may be stored most plentifully, and that is by Molosses of Sugar, Raisins, Macarates, with water, and the like. *There was a Gentleman, who having a late* Swarm *of Bees given him, which was so poor, that it could not be thought possible for to live out the Winter, did by my direction make a mixture of a pint of Molosses with three parts of Rain-water, to which he put in a little meal, and sprinkled in it some few floures*: The mixture being set neer unto the Bees, they flockt to it, and carried it into their Hives, and so would in lesse than a day empty a shallow broad dish, *By which meanes they, before full three weeks were out, were so over glutted with Honey, that by the next Spring they were drowned with it, and in that Hive was found no lesse than thirty pound weight of the Honey and Wax.*

The

The Molosses was not that which the Sugar-refiners leave, for I know not what an enemy the lime *Alcali* that is in it may be to Bees, but the first Molosses. Now I should for my part rather take the refuse Honey which is got by squeezing the Combes, and also the Combes washings, which I would sprinkle with a little meal and Anise seeds small beaten, the one to keep them from drowning in it, the other for scent, and this, I am assured, will feed Bees excellently, and for one pound they will return four: *This I know*; The water best for this purpose is that of Rain, which hath in it a sweet Salt. And that no man may wonder at this, consider how that Honey originally is but dew, which is but little different from Rain: For as a milch Cow drinking soundly of water, doth actually give the more Milk, which Milk is farre different from water, yet multiplied by it even to sense, so naturally doth the Bee transmute what it sucks into Honey, insomuch that if the Bee be but allured with the fragancie of the scent, and never so small taste of sweetnesse to suck up material water, yet that it will as well make into Honey, as if it were a substance thicker of consistence.

And as for the Wax, of which the Combes is made, I cannot perswade my self that it is the Gum of the stalkes of flowers and tender leaves (in a Microscope to be discerned) which the Bee gathering together, doth of it make Combes: For *it is evident, that Bees doe suck out of severall things, nay, almost out of innumerable Simples, of all which they make (as but one Honey) so but one Wax.* In *Russia* and *Muscovy* (I am informed, that) the Bees gather out of the weepings of Pine, Firre, Spruce and Deal Trees (which are onely Therebinth) abundance, both of Honey and Wax, which yet is the same in kind with ours in *England*, whence I conclude, that Bees doe make (as their Honey, so) their Wax, out of that which before was not Wax, otherwise it would be a very Heterogeneal body, since the weeping Gum of each thing is variated, and followeth the property of that Vegetable to which it belongs. Besides, there is a vast difference between Gummes (of which some are wholly liquable in Water, others partly) and Wax, as also betwixt it and Rosin of any sort, likewise its peculiar Specifick Odour is not common to any other thing with it self.

No

No marvel then, if *Bees may be fed with their own Honey, mixed with three times its quantity of rain-water, and out of it they should again make Wax and new Honey*, since like to this is a Cows making out of simple water blood, milk, and urine, of which blood and milk come but little (if ought) short of the proportionate pondus of Honey.

Nor is the smalnesse of the Creature to be accused as if in consistent for so great a task, since God hath made each thing sufficient to its destinated end; yea, and the same Creature with a contemptible stroke of its revenging sting (which is not much thicker than one of the pores of the Cutis is wide) can swell and inflame our Body so beyond its own dimensions, that a prick in the face (to my knowledge) hath made one to be for more than a day blind, his eyes being swell'd up, and his face twice as big as before.

Now to resume, what in the beginning I touched, of the excellencie of Honey, it is good to eat, both pleasant and wholsome, in Chirurgery and Medicine of excellent force, and inriched with a rare Quintessence. But besides, *by help of it and grain, may be made most excellent Wine, nothing inferiour to the richest Canary or Greek wines, and by the mixture of it with the Juyce of fruits, the best French or Rhenish Wines may be paralell'd, if not surpassed. Nor will any of the Specifick Odour, either of the Honey, or of the Corn, after a threefold fermentation remain.* It also will yeild a most excellent *Aqua vitæ*, yea it will help such things, which (by reason of their too much propensity to souring, and slowness to a working fermentation) would yeild spirits but sparingly, to ferment exceedingly, and so to yeeld their spirit copiously, as, to wit, many Berries, Roots: &c. *It also will by its addition make as excellent Vinegar out of Cider, as any* France *yeilds, without exception.* Lastly, *any Wine which is neer pricking may by its help be recovered, brought to a new fermentation, inriched with a new Body, which before, being almost worn out, was hungry and lean, and so made as Rasie, pleasant and durable as ever*, provided it be not already sour. If these qualities be not sufficient to commend it, I shall add no more.

Thus Sir, I have briefly, and yet in a large Epistolical discourse, endeavoured to satisfie you what I can, as to this Subject. *I confesse*

fesse my self to have been not very free in this thing, not for that I would not be ready in a greater matter to be serviceable to you and the Publick for good; but truly, I am one of those, who are farre more willing to learn than to assay to teach: The World is now full of Books, of which if a good choice were made, one tenth part of the chief being cull'd out, I should willingly passe my suffrage, that the other nine patts should be corrected by the fire, among which this Epistle of mine should, by my vote, passe for company. For verily Sir, sithence nothing is to a man more pretious than time, it is requisite, that those things which consume that most precious and irrecovocable Jewel (when once lost) should be τὰ δοξόλαλα; yet I doe assure you, these things (though perhaps comparatively, many of them but trivial) I speak not opiniably, but what I know, and that experimentally; yet must I confesse, that the Subject, lying not altogether in the Sphere of my most serious Contemplations, perhaps hath not been handled as it might have been, by another more conversant therein, since mellification, respects the work and labour of this Insect, not its Physical virtues; *I* then, whose chief station is among natural things, to examine their Analytical Phylosophy, and to discover their Qualities, as applicable to the Art of Medicine, together with their parts in Composition, their graduations in vertue, their Extraction of the Crasis in them contained, their various transmutations, alterities and applications. This, I say, being my τὸ ἔργον and other speculations (among which this of Bees, most applicable to a rural life, from which my profession is in a manner alienated) coming in but as παιδεργα, serving for recreation and pleasure, no marvel if sleightnesse in its handling by me should be found. Yet as it is I hope you will accept it, as proceeding from a mind devoted to serve you; *I* wish therefore, that it were more worthy your acceptance; yet as it is *I* humbly offer it to you, as an acknowledgement of what *I* desire to perform, and an Earnest of what *I* may hereafter, and that shortly, send forth after this, in case these my first fruits be acceptable.

There are herein couched many hints of divers useful Experiments, which are not altogether ungroundedly intruded into this Epistle, as having dependance some way or other on the pro-

propoſed Subject, which I inſerted the rather, that by ſuch touches, which concern things within my own Sphere, *I* might qualifie the ſleight texture which is ſpun concerning the propounded theme, which is, as *I* ſaid, an enquiry rather of my ſpare houres for recreation, then any part of my task. *I* pray accept what ever it is, as coming from him, who would have beſtow it as freely, if of farre greater value: *I* ſhall now no further trouble you, but pray the Lord, who is the fountain of all bleſſing, ſo to order all your wayes and endeavours, that they may be a bleſſing to all thoſe, to whom you devote your ſelf, to ſerve by all your pious publique atchievements; this is, and ſhall be the prayer of him, who is moſt affectionately

Your unfeigned Servant

G. S.

An Enlargement of the fore-going Philoſophicall Letter, explaining more fully divers of thoſe deſirable Paſſages for general Riches and Profits: With the Reaſons why no more is diſcovered at this time.

I Received yours of Admonitory Annotations from my laſt Letter touching Bees, in which my ſcope and intent being to ſpeak concerning Mellification, in reference to yours ſent to me, concerning the uſe of Aniſe in the keeping of Bees; many other things fell in accidentally, in which if *I* were the more brief, it is the more venial, ſince it was not directly, but onely collaterally agreeing with the propounded ſcope of that Diſcourſe. *I* ſhall therefore, having peruſed thoſe Annotations, return you a larger account of the things therein contained, which *I* hope will be ſufficiently ſatisfactory to any ingenious Spirit.

The firſt Anſwer (ſo it is called) doth ſeem to deſire in that Epiſtle an open candidneſs, and a candid openneſs: in that *I* conceive *I* was not onely open, but alſo plain, and *I* doe not know what *I* ſhould have added, as to the matter propoſed, and not have exceeded the bounds of an Epiſtle, and therefore I really

really intended what I said, and did conceive my apertneſſe a candid Teſtimony of my intentions.

Now as to the ſecond Anſwer, to my confident Aſſertion of the fecibility of *Aqua vitæ* out of grain unmalted, &c. and the producing of Wine out of fruit and alſo grain, equal to Spaniſh and French Wines, by the meanes of Honey, I conceive, that what was written is ſufficiently full and plain. For to write a Receipt is a thing both ticklish, and not ſo convenient.

For firſt, a man who doth try many Experiments, doth not obſerve ſo nicely all the Circumſtances, as if he were to improve the ſame for profit, onely takes notice what is the effect of his Experiments in general. Now it is certain, that the quantity of matter, and the quality of operation on the matter, may differ but little as to apparency, and yet work a plain diſtinct effect. Beſides there is not any one Mechanick, which hath its Baſis on Philoſophy, in which there are not many errors, into which an Artiſt, that hath been long verſed in the Practique, may hap to fall, and he may thank gray-headed Experience for teaching him to amend his errors, and for ſome caſual diſaſters no remedy yet hath been found, either totally and infallibly to prevent, or to amend the ſame, as in Malting, Brewing, Tanning, Sope-boyling, &c. which I might inſtance in, if need required, and time would permit.

So then, though I know that out of ſuch Materials ſuch a product may be, yet I know withall, that my ſelf have in my Experiments oft been fruſtrated, even in thoſe things which before I had done, which error I could not on ſo few trials know to what cauſe directly to aſcribe.

Now if in things by me found by caſualty, I can hardly hit the ſame thing again, when I aſſay it (*de induſtria*) without ſometimes various errors, it would be not an edifying, but rather a ſtumbling courſe, to lay down a Receipt, and in ſo many words to relate my own Encheiria in its particularities, would be tedious, and not ſo uſeful, for I know, that he who tries many fortuitous Experiments, not to ſeek for any particular thing, before propoſed to himſelf, but rather to ſee what will proceed from ſuch and ſuch things ſo ordered, it is to be conceived, that what he attaines to is by the fartheſt way about, which to him, in

those accidental trials, proves the neareſt way home.

But if this were to be further proved upon the account of profit, another courſe muſt be taken, of doing in greater quantity, and the eaſieſt and ſhorteſt Method is deſired. Therefore I, like a Traveller, did intend onely a relation of things fecible, which I have my ſelf again proved and on my reputation affirm, both poſſibly and eaſie in nature; and this I did to ſhew the Good which might accrew to the Publique by the proſecution of your Deſign, both in ſtoring the Land with Corn, Fruits and Honey. I added the Meanes or Key, both for the one and other, namely, by reiterated fermentation, and ſo writing, I wrote to ſuch, who in ſome meaſure underſtood Phyloſophy, who weighing the effect with its cauſes, might not ſtreight condemn my Candour, in caſe he for once or twice ſhould prove unſucceſsful, whereas a Receipt is every mans meat, and to ſuch who leſſe underſtand Nature, what Receipt can be full enough. For he who writes, meaſures other mens underſtanding partly by his own, and what he underſtands fully and ſcientifically, he preſuppoſeth another will underſtand ſufficiently, and therefore leaves out many Circumſtances which are not ſo neceſſary, or may be otherwiſe, or ſuch which he preſuppoſes (*præcognita*) or what a ſmall inſight into practique Phyloſophy may dictate. My meaning is, that in as much as thoſe Experiments were not ſo reiterated, as a Tanners making his liquor, I could not poſſibly throw the Receipts into the mouth of every one that could but gape. For what I try in a gallon, if I ſhould preſcribe in that quantity, my Receipt would be contemptible, if I ſhould analogize by proportion, my Doctrine might be uncertain, in the particular which is moſt certain in the general. My Work is to hint to the Ingenuous what may be done, and let it be ſufficient that (*fide bona*) I deliver what is really true in Nature, and adde the onely Meanes, which is by reiterate fermentation. But yet to adde what light I can to him, who would attempt this, I ſhall, ſo farre as in me is, diſcover things more punctually

Firſt as to *Aqua vitæ*, let Peaſe be taken and ſteeped in as much water as will cover them, till they ſwell and Corn, and be ſo ordered as Barley is for the Malting, onely with this difference, that for this work if they ſprout twice as much as Barley doth

doth in making Malt it is the better: these Peaſe thus ſprouted if beaten ſmall, which is eaſily done they being ſo tender, put into a veſſel, and ſtopt with a Bung and a Rag as uſually, theſe will ferment, and after two, or three, or four moneths, if diſtilled, will really perform what I promiſed.

The Water that ſoaked them, it is good to ſave, either for the ſoaking of freſh, or for putting on them, being beaten, which elſe require ſome quantity of water to be added to them, but not much, and the like may be done in all other Grain, which the addition of refuſe Honey will advance (as to quantity of Spirit) exceedingly. Thus may a Spirit of *Aqua vitæ* be made out of any green growing thing, of which the leaves being fermented, will yeild a ſmall quantity of ſuch a Spirit. So Roots, Berries and Seeds, which are not oyly, yea and thoſe which are oyly, whoſe fatneſſe is eſſential, that is, which may be diſtilled over in an Alembick with water, will afford ſome more, ſome leſſe of *Aqua vitæ*. Let me adde, that the Spirit which is made out of Grain not dryed into Malt, is more pleaſant than the other.

Now give me leave to adde my opinion, and what I would try further in this caſe. I would often ſtir the matter in fermentation, that is, once a day, during the firſt twenty dayes, and for the firſt week, when it begins to work, give it a ſmall vent, which to me ſeemes a way of bettering the fermentation, and by conſequent of augmenting and meliorating the Spirit. But in this I leave every man to his own Ingeny, and ſhould be glad to have theſe my Experiments ripened for the good of many.

Now as to Vinification, let me for a ground lay this down for a Poſition, that the vegetable Spirit in all Hearbs, Trees, Plants, and Fruits, Berries, and alſo Seeds, (not of a groſſe oyly nature) is vinous, but in Grain and fruit more eſpecially of the later, of which the Grape is but one Species. Now in both, the Rule to diſtinguiſh the copiouſneſſe of this vertue is the ſweetneſſe; for by how much the more of that, by ſo much the more of the Vinous Spirit.

Now Honey is a Vegetable Magiſtery, in part perfected by the Specifick virtue of the flour, &c. on which the dew falling, is made ſweeter than of it ſelf it was, (yet formally diſtinguiſhed

from Honey, which I have oft proved by distillation) but is compleated by the peerlesse virtue of the Bee, which doth transmute that sweetnesse into a new Creature, which is Honey. This therefore, by reason of its eminent sweetnesse, is rich of that vinous Spirit fore-mentioned, and may therefore be preferred to either Grain or Fruit; for example; Let the tryall be made with about a gallon of Honey, despume it, and adde to it about an equall part of Water, or three parts of Water to two of Honey, ferment it with a treble fermentation, and after six moneths this will be farre richer, both in tast and smell, than any Wine that comes from any of the Spanish Territories, and that by farre. But as the price of good Honey goes now, to have a quart of Wine in its materials to cost a shilling or sixteen pence, which is the price of good Honey, would be a dear rate; by which it may appear, what the benefit of your present Design of inriching us with store of Honey may be; for I say, what I have tried, that Wine made of Honey alone without any other thing, thrice fermented as it ought to be, gives a drink more like a celestial Nectar then a Terrestrial Wine, both for Taste and Odour.

But Graines gives a more Austere Wine, and alone much resembled a tyall Wine, which is done thus. Take as much Malt as a Cask will hold fill it with scalding hot water, that the water be no more than the Cask will hold after it is full of Malt; let it soak so for a day and night, then presse it out exquisitely, as Wines are pressed, then put it into a vessel, and with Yest bring it to work, which by every day moving with a rod, and covering it with cloths, and not giving it much vent, will be continued at least six or seven dayes, so much the better if the vessel be so big beyond what it containes, as that it work not over, and the vent that is left be small, but the bung so closed, as that it may be opened and shut daily for to stir the matter soundly, and when the ferment is ceased, with new Yest bring it to a second, and so to a third fermentation, observing the same method as in the first, then close it well, and set it in a cool Cellar for about four moneths, in which time it acquires the natural properties of Wine, and may be accordingly handled.

Now by this that hath so plainly been set down, any ingenious

ous man may, by the addition of Honey in a various proportion, make what distinction of Wine he pleaseth, and the same with the juyce of Fruits, with this difference, that Fruits doe yeild a Wine neerer to Rhenish and French then to Spanish Wines.

Now as to the Spider which I mentioned, I was not then so principled in Physiosophy, when I lived in those Islands, as to observe every observeable thing, but since have heard of a Maid, who of that Silk hath (for tryal sake) spun and knit a pair of gloves, which prove no whit inferior or lesse durable than the best Silk, whether then they may be transported hither or no, I know not, but if not, yet in the Plantation, where they are naturally (being under this Government) I presume they might with ingenuity be made profitable; first, since they multiply so abundantly: Secondly, live in the open fields, not annoyed with weather: Thirdly, give Silk so copiously, for out of one large Spider, in a day, one may draw at the least two drachms of Silk, if they have an intire Web they spend little after it is made, but if fed fat, they may be taken in ones hand, without danger to ones self, or dammage to the Creature, and one may out of its body wind a good ball of yellow Silk daily, which being washed is white enough. Fourthly, they will feed on Flies, or any blood of beast cloddered exceedingly, and all their nourishment may be forced out in Silk, which they as naturally make in their tail (which is a great bag, like a Pigeons Egge in bigneſſe) as Bees doe Honey.

Now if the Silk-worm that is so tender, may be so improved, being so hard to feed, and must be kept in houses, much more these Spiders, which are so hardy, and will feed on any trumpery (and who knowes what they may be brought to eat, I my self have fed them with pieces of Figs) may, in my opinion, be brought to singular profit, which, if kept in an open wicker Cage in the open air, may be fed at pleasure, and robbed of their Silk, at least every day, and that not a small quantity at a time. I perswade my self, that one large Spider of this sort, would yeild more Silk in a Summer than six Silk-wormes, and that may render them worth the keeping, their Silk being full as good as any. Yet they may doe as well here as the Silk-worm, for ought I know,

know, being by ten fold more hardy than any Silk-worm, and Flies are a sufficient food for them, which how easily taken I need not mention.

As to the Indian Fig, the usuall name of it is the Prickled Pear, so known in that place, and as to the transportation of it hither, here to grow, it is enough it growes there, being an English Plantation, or the fruit it self may, without the tree, be yearly brought over at rates reasonable enough, if first any ingenious man (whom it may concern) should, for trial sake, send for a small parcel, and upon tryal find it advantageous. I for my part procured of the fruit for my Experiment, and found the generation of that Insect out of it, which way I recommend to any that desires further resolution in that Point.

Now as to the Generation of Insects, *I* shall give my usuall Encheiria, though I need not, having particularly set down the same work, how it is performed out of the blood and livers of beasts, which were enough to any, who by the length of *Hercules* foot, could calculate the proportion of his whole body.

Vegetables of tincture are either Hearbs, Woods, or Fruits, as Berries, &c. as for Hearbs, I dry them (if dry they yeild the best tincture) otherwise stamp them, and let them dry, till they will suffer no juyce to run from them, (this in the Sun or in a proportionable heat) or if dryed, I infuse them with water in a heat about twenty four houres, then vapour away the water, till the dissolution be as thick a sirrup (but for this use strain them not from the feces) this masse I take and put it into an earthen or wooden Vessel, with some straw or something, and bottom (that it lie not too close) and so I proportion the quantity to the pot, that the air may come about, and into the masse, (yet not too much) then I set this Vessel in a ditch or pit made in the earth in a shady place, and put about it some wet leaves, or such putrifying rubbish, and over it a board, and on that some straw or the like, and so it produces, first a shelly husky Worm, and then a Fly of the tincture of the Concrete, but durable, and somewhat more advanced.

Berries I stamp and boyle them, or evaporate them to the consistence of a Rob: and then use them as the other.

Woods I infuse in water, being pulverised, and boyle out their tincture,

tincture, and then evaporate the water to such a consistence as the other, and use them in the like way. The Flies will play about the sides of the vessel and surface of the matter, which taken, are killed in a warm pan or stove, and dryed, and so kept.

Thus out of a red Berry, of which I spake in my former Letter, I made an Insect no whit inferiour to the best Cochmeel, and I suppose I have added sufficient to the Information of the weakest capacity.

As for my History of one who did so feed Bees, as I spake of in my first Letter, the Gentleman is at present both out of *London, England,* and this Life, being lately dead.

Now what concernes the Doctrine of Fermentations, on which depends the unfolding of the Mystery of Mellification, and making Wax, I have reserved that for another place and time, since being prolixe and Philosophical, it doth require a peculiar Treatise, and I falling on it here, found it too abstruse to be briefly handled, lest brief Instances, which I should be forced to bring, should beget a thousand scruples and new questions. As for the practique of it, this dilemma answers all: Either it will, or it will not; if it will, then farre more Bees may be kept, if out of (Not Honey) they make Honey, and out of (Not Wax) they make Wax, by an actual transmutation, which I experimentally affirm: if not, then fewer can be kept, if they must seek their Wax out of the Gummosity of some floures, as some fondly imagine, since Wax formally differs from any fatness under Heaven. One half houres attendance in a day on a late Swarm of Bees in *July* or *August*, will put all out of question to any other that shall try it, as it hath been experimentally put out of controversie to me. But to lay down the Philosophy of the thing will maime a large Treatise, which I have in Latine composed (*de fermentis*) which I shall be unwilling to dismember, and send part of it out lamely in an English dresse.

Lastly, as to the mending of Wines, it is done the same way as new are made. *viz.* by dissolving Honey in some quantity of it self, and warming it so, as it lose not the Spirit (which is to be therefore done in a close Vessel) then put to the Vessel of Wine, and by Yest (or otherwise) let it be brought to a thorough

work.

working (as at its first making) so it recovers both life, taste, body and goodnesse, and may then be preserved as if it never had inclined to pricking.

Sir, I hope this will be a full illustration of my former Letter, so as that no man shall be able to desire greater candidnesse. I commit you, in these your pious Endeavours of the Publique good, to his protection, who will undoubtedly at present blesse you in this your Enterprise, and hereafter requite the ungratefulnesse of men to you, on this account, with a plenteous reward.

I am,
Sir, your most affectionately
devoted to serve you
G. S.

A very cheap way to keep a Stock of Bees all Winter long.

TOstes of bread sopped in strong Ale, and put into a Bee-hive, is very good and cheap food for Bees, of which they will not leave one crum remaining.

It will be fit sometime to lay some dry Meal or flower of beanes, which dry Meal is given them sometimes as Hey or Corn is to Conies, or upland pasture to Sheep in times of great rain, to prevent the rott, and such diseases, as will necessarily follow from continual moist food.

By this meanes you may feed a whole Hive of Bees for eighteen pence or two shillings all the Winter long.

Q. Whether any other Flower or Meal will not serve? And whether it would not be the sweeter, and therefore the better, if the Corn (whether Beanes or any other) were well maulted?

Another notable and approved Experiment for improving of Bees.

TAke an handful of Melissa (that is an hearb which we commonly call Baume.)
One drachm of Camphire.
Half a drachm of Musk dissolved in Rose-water.

As much yellow Bees-Wax as is sufficient.
Oil of Roses as much.

Stamp the Baume and the Camphire very well, and put them into the Waz, melted with the Oyle of Roses, and so make it up into a masse; let it cool before you put in the Musk, for otherwise the heat will fume away most of the scent of it.

Take of this masse as much as an haselnut, and cleave it within your Bee-hive. It will much increase the number of your Bees, not onely by provoking them to multiplication, but also by enticing many strange Bees to come thither, and abide there. You shall also find, both in Honey and Wax, three times more profit than otherwise you should have had.

A Coppy of a Letter, written by Mr. William Mewe *Minister at* Easlington *in* Glocester-shire, *to Mr.* Nathaniel Angelo *Fellow of* Eaton *Colledge.*

SIR,

BEing made known to you, I could wish it had been by a better Character than a Bee-Master. Tis true, since I left the hot service of the City, I have an Apiary in the Country, wherein I found profit enough: But I considered, that Wax and Honey was not all the benefit which God afforded from that Creature; he that sends us to the Ant, gives us leave to observe the same and better qualities in the Bee; I observed many rarities in their work and government, by mine own experience upon *Buttlers* Observations: But when he told me of a Gentleman, in *Plinies* time, that endeavoured to make their works transparent (but, as he thought, improbable) I tryed, and finished that Essay, to the satisfaction of my self and others.

The Invention is a fancie that suits with the nature of that Creature, they are much taken with their Grandeiur, and double their tasks with delight; I took fourteen quarts out of one of the transparent Hives, double their quantity of others, they quickly paid me the charges, with their profit, and doubled it with pleasure; I can take a strict account of their work, and thereby guesse how the rest prosper. Every time I view them (whilst their work lasts) I have *aliquid novi* (something new)

which must needs be more pleasing than the sight of a Fountain, which affords but water, running in the same manner. This Honey diversly placed with diversity of Combs, whereof I have observed six fill'd in six dayes, of so many quarts, but it was in the time of a Mill-dew.

If you desire the Model or Description, I shall give the same to you that I did to Dr. *Wilkins*, Warden of *Waddham*, who hath, with great curiosity, set up one in his Garden, and, as I hear, is setting up another with augmentations: I intended it at first for an Hyerogliphick of labour, upon which a Gentleman bestowed a Statue of that form to crown it, which in three yeares standing yeilded to the injuries of the Wind, Weather and Sun, which being repaird now leaves at the bottom of the Pedestal, with this Inscription, *Non amissus sed submissus* (the Emblem of our Calling) instead thereof are erected at the top three Trygonal Dyals, over them three Weather-Glasses, with a Clepsydra to shew the hour when the Sun shines not, over that a Cock, that will speak the Winds seat at Mid-night, upon which is bestowed a Saphigue to satisfie the Latine or English Reader, thus;

Has Apes Dury Labor hic Coronans
Occidit, Sole, & Borea Maligno
Quos Vigil Gallus Capit & superstes,
Clepsidra Monstrat.

Labour held this, till storm'd (alas)
By Weather, Wind, and Sun he was;
All which are wacht, as here they passe,
By Diall, Weather-Cock and Glasse.

Thus farre have I denied my self to gratifie your friendship, which I hope will give the grains of allowance, and concealment to a suddain paper, which I could not deny to the Bearer of a Letter from you; but if you please to take a sheet and napkin with me for some time, we shall discourse of this, and better Matters.

Mr.

Mr. *Hartlib* is a Gentleman, whom I know not, but by your worthy Report, I never saw his Works, but shall get them as soon as I can, if in the meantime he shall visit me in person, or by letter, with Questions within my sphere, I am a Flint that give fire at the first stroke; I like them well that veiw *Magnalia Dei in Minimis*, if every man of my ability, through the Land, cherished so many Hives as I doe, it would be in our Commonwealths way 300000 *per annum*, which is lost by negligence or ignorance of the use of that Creature. When I see you, I shall offer more to your consideration than is fitting to be written; the Lord furnish you and me with ability, and fidelity, in our Calling, For 'tis no great honour (saith *Plutarch*) to be excellent out of that.

Eaſtington this 19th of *September*. 1653.

True Friend,
Your
Faithful Servant,
WILL. MEVVE.

A Coppy of Mr. Hartlib's *Letter to that worthy Miniſter, at* Eaſlington, *Mr.* Will. Mewe.

SIR,

I Am willing to confeſſe my fault (if it be a fault) that my worthy Friend Mr. *Angelo* took notice of you, as an excellent Bee-Maſter: for knowing you by your other better Characters, which are ſo publique, that none can be ignorant thereof, who hath heard of your name, I gave him notice of your rare induſtry (a thing not ſo publiquely known as it deſerves) in diſcovering the induſtriouſneſſe of that pretty Creature, and my deſign was to get him to write to you, ſo as to make ſome overture for me, to uſe freedome afterwards with you about that Subject, which he having done, and you having entertained with ſo much alacrity, and hearty expreſſions, I am bound to thank you for it, and deſirous to expreſſe my thankfulneſſe with ſuch Communications, as are within the ſphere of my activity of this kind, or of any other better matters of a publique nature;

and in testimony hereof, be pleased to accept of the adjoyned Packet with several Treatises and Books, wherein also you will happily find something, which may give occasion to your ingenious spirit, to try some other Conclusions of Husbandry with delight and profit: For God's Way's to such as find them out are full of both; and I am apt to believe, that when God set *Adam* in the Garden *Eden* to keep it and dresse it, He meant to exercise his Industry, as well about the discovery of the fruitfulnesse of perfect nature, which could not be without much delight to his understanding, as about the pleasantnesse of the place, which he could have by dressing increased, and made compleatly answerable to the perfection of his own imagination. For although there was nothing imperfect in Nature before the Curse, yet all the imaginable perfections, which the seminal properties of the Earth contained, were not actually existent at the first instant; the kinds were each distinct by themselves, without any defect, but what Marriages and Combinations there might be made between them, and what the effects thereof would be, when the proper Agents and patients should meet, I suppose was left to his industry to try: and although we now come farre short of that knowledge, which he had in Nature, and the Womb, thereof, by reason of that Curse is shut up unto us: Yet we find by Experience, that to such as are her faithful and laborious Servants, and find out the Seat of Gods Vertue in her, to trace the Way of his Operation, She rewards alwayes their paines both with profit and pleasure, which in your Answer to my fore-named worthy Friend you bear witnesse unto, when you tell him, that in your Apiary in the Country, you not onely found profit enough (and what you mean by enough is left to our conjecture) but that besides the benefit of Wax and Honey, you gained more delightful Observations of their Working, and Government, then happily the Ant can afford us; which because I doe very fully believe, therefore I am an humble Sutor unto you, that at some spare time you would renew to your own memory your delightful contemplation of the rare qualities of that Creature, and putting them to paper, shew forth the Wisdome of the Creator therein, for such things should not be concealed, because they are reall Demonstrations of his Power,

and

and I am perſwaded, you will take it in good part, that ſuch as love Him for Himſelf are curious to know the Workmanſhip of his hands, and the Wayes by which the beſt diſcovery thereof is made.

If then upon this account you would let ſome of your ſparkes flie abroad amongſt us, you may perhaps kindle ſome light more than we have, which in due time may reflect with ſome heat upon your ſelf back again. For you tell us, that Dr. *Wilkins*, Warden of *Wadham*, is ſetting up a Glaſſe-Hive in his Garden, with augmentations to that Model which he received from you, which no doubt he is obliged to impart unto you, as to the Father of the Invention; and if I may be ſo happy, as to be your Scholler, both in that which is your own, and what is ſuper-added by him, perhaps my Friends and I will not be altogether unfruitful, at leaſt we ſhall not be unmindful of you, but give ſome return of what our Experiments may produce. But to doe this we muſt be ſet in the way by you; therefore give me leave to beg a full Deſcription of your tranſparent Hive, in the Parts and Dimenſions thereof, and if you have any to ſpare (now the ſeaſon is paſt) and would ſend one up by the Carrier which comes from your parts, I ſhall undertake to ſee it ſent back again unto you without your coſt. If you have many Glaſſe-Hives, you will be the better able to gratifie me herein, but if you have none to ſpare, I ſhall reſt ſatisfied with that, which you ſhall be pleaſed to afford me with your convenience.

The Reaſon wherefore in the Glaſſe-Hives the Bees ſhould double their Work, and delight in their Grandeiur, I conceive, by what you write, is diſcernable, but as yet I cannot reach it, till by your Experience and Sagacity the hint be given me, that I may in due time by my ſelf, or ſome Friends, make alſo a tryall thereof.

But have you yet been able to make any eſtimate of the quantity of Wax and Honey, which they are able to give one year with another, ſeeing you ſpeak a very big word of 300000 *li.* a year, which might accrew to the Nation from this little Creature? I make no doubt, but you are able to make this out, although it doth, I confeſſe, goe beyond my reach, and to raiſe the Induſtrie which may be uſed towards the Common-wealth

of

of Bees in this Nation, it would be a thing worth your publique disposition to give a Demonstration thereof; for I suppose it will be grounded more upon the plenty, which your new Invention doth yeild, then upon the ordinary way.

But happily your Experience to something also extraordinary concerning the feeding as well as the Hiving of that industrious Creature, will give some further addition. For no doubt there are certain Hearbs which make them thrive better than others, of all which, if at your convenient time you will be as good as your word, a good Flint to give fire at the first stroke, you will give some of us cause here to rejoyce in your light, and I dare promise, by the grace of God, your sparkes will not fall in vain, but will find good tinder, at which many candles may be lighted in due time.

You see how large and free I am, but your Ingenuity hath provoked me, and I aime at nothing, but what may be an advantage to the Publique, and a matter of credit and due respect to be yeilded to your self, by,

From my house neer Charing-Crosse over against Angel-*Court, the* 17. November, 1653.

SIR,
Your ever faithfull, and most willing Friend to serve you,

SAMUELL HARTLIB.

An Extract of Mr. Mewe's *Answer to Mr.* Hartlib's *Letter.*

Worthy Sir,

THe knocks and calls of two such unknown Friends, as your self and Mr. *Angelo*, coming with such choyce Books, and so much candor, *expresst in too many, and two friendly Letters*, were enough to make the soureſt Hermite look out of his Cell, especially if he spies the coasts clear without Swords and Pistols. The truth is, I am but one of many my fellow Shepherds, that have taken Sanctuary in our Cotts, ever since the Alarme was given

given us by the Anti-Pastoral Party, and being likely to be stript to the Bag and Bottle, you cannot blame us, if we whistle away some of our sad and spare houres (whilst Shepherds are smitten, and Sheep scatter'd) to observe *Magnalia Dei in Minimis*, Melancholy loosers will rather play at small games than give over.

When I saw God make good his Threat (*Solvam Cingula Regum*) and break the Reines of Government, which hung (but too loose) upon the neck of the Beast, I observed, that this pretty Bird (whereof you write) was true to that Government, wherein God and Nature had set it to serve: Hereupon my pleasure began to vye with my profit, and I was willing, for once, to yeild the stakes to my pleasure.

Briefly Sir, being sent for up, amongst others of my Profession, to serve the State, I left a Model of this innocent Phancie in past-board, which at my return (by the care of my vertuous Wife, now with God) I found set up in the midst of my Garden in plain Free-stone; In this I placed an upper and lower Hive, over them a Trygonal Dial, over that three Weather Glasses, over that a Water-watch topt with a Weather-cock: This placed in the stead of the Statue of labour, which the Wind and Weather had brought from top to bottome, so that it was obvious to my Phantasie, to conceit this to be the Hyerogliphick of their Hyerarchy, whose labour was lost in their Grandeiur, and brought to that low price, that any of their meanest quality might come up to it, and be taken at his word, though he bid never so meanly.

I considered, that God gives us leave to make the most and best we can of those Relicks of his goodnesse, whereof we have baffled away the better part; as those Travellers, that have benighted themselves by their frolick baitings, make much of their diversified reflections of the Sun-set in the Clouds, and when they have almost lost his light, make passe-time with his colours.

This will excuse me (in case I fall short of that profit which you suspect I make) that I begin and stand so long upon the pleasure, and shall now take leave to surfet you with my Honey-sops, before I light you out with my Wax-tapers, and then as you

like

like this, you may call again at my Hermitage.

Sir, about the time that you offer'd your Essay to the Parliament, for the Office of Addresses, I was at *London*, and being by Mr, *T. S.* (the then Secretary of State) invited to a Fish-dinner at the Boares-head in *Fish street*, there meeting with four Collonels and their Ladies, and some of these of the first Magnitude, I was put upon it to give them the description of my Beeston Castle, which I merrily put off, and told them, I knew not the Faces of Half the Company, and unlesse the Governesse of the Feast would undertake that I were secure, *sub Rosa*, I could not tell how a plain Narrative might be construed.

Sir, upon importunity and promise I told them, that hearing a great noyse, strange and unusuall, amongst my Bees, I went out and found a white Lions-head, blackt over with a riotous number of Bees, not working or swarming, but ranting and roaring, and being brought, by the conduct, of some of them, unto an handful of them knit under a Cherry-tree, amongst whom I found the Queen in the midst of them. I had her convey'd into the Lions-head (the place from whence she came) into which the mutinous and disorder'd Regiment follow'd immediately. I carried in this good newes, of the saving of an Hive and Swarm of Bees, and bringing forth two of my Friends to rejoyce with me, we found them in the same or a worser confusion; hereupon I followed some Bees, that guided me unto a Rosemary bush, under which I found the Queen the second time, in the midst of a stronger Guard, but (as I doubted) sick and weak; I took her into my hand, bid my Friends observe, how in the opening of my hand the Guard would fly in, and doe their office to her, which they did (as *Virgil* describes it) with as much homage, as the *Persians* to the King or Sun; this done, she was the second time restored to her Regiment, but went away with them the next day, and left nothing but empty Cells behind her.

This Narrative, at the Boares-head, was diversly taken; some began to moralize it, others to ask, whether I (that took them off from State matters) did not bring them in again, at a back-door, with a design? I presently chalenged my protection of the

given us by the Anti-Pastoral Party, and being likely to be stript to the Bag and Bottle, you cannot blame us, if we whistle away some of our sad and spare houres (whilst Shepherds are smitten, and Sheep scatter'd) to observe *Magnalia Dei in Minimis*. Melancholy loosers will rather play at small games than give over.

When I saw God make good his Threat (*Solvam Cingula Regum*) and break the Reines of Government, I observed, that this pretty Bird (whereof you write) was true to that Government, wherein God and Nature had set it to serve. Hereupon my pleasure began to vie with my profit, and I was willing, for once, to yeild the stakes to my pleasure.

Briefly Sir, being sent for up amongst others of my Profession, to serve the State, I left a Model of this innocent Phancie in past-board, which at my return (by the care of my vertuous Wife, now with God) I found set up in the midst of my Garden in plain Free-stone; In this I placed an upper and lower Hive, over them a Trygonal Dial, over that three Weather Glasses, over that a Water-watch topt with a Weather-cock: This placed in the stead of the Statue of labour, which the Wind and Weather had brought from top to bottom, so that it was obvious to my Phantasie, to conceit this to be the Hyerogliphick of their Hyerarchy, whose labour was lost in their Grandeiur, and brought to that low price, that any of their meanest quality might come up to it, and be taken at his word, though he bid never so meanly.

I considered, that God gives us leave to make the most and best we can of those Relicks of his goodness, whereof we have baffled away the better part; as those Travellers, that have benighted themselves by their frolick baitings, make much of their diversified reflections of the Sun set in the Clouds, and when they have almost lost his light, make pass-time with his colours.

This will excuse me (in case I fall short of that profit which you suspect I make) that I begin and stand so long upon the pleasure, and shall now take leave to surfet you with my Honey-sops, before I light you out with my Wax-tapers, and then as you like this, you may call again at my Hermitage.

Now what concernes the profit, you tell me of a big word I should let fall, of 300000 *lib. per annum*, which our Nation might make of them, if all of my ability would undertake to keep as many as my self; one cipher mistaken may much alter the sum; but grant it so as you have set it, cast it thus, I never kept twenty Stalls, and usually take but half, yet doe I value my Wax and Honey worth twenty Nobles at the least; Now if he that is valued but as the tenth part of a Parish, at most, can make so much, what may the rest? what may the County? what the Nation?

Whereas you say, a place may be over stockt (granting Mill-dewes) I deny it. Had we an hundred Hives for one, where there are store of Oakes and Maples, the place cannot be over stor'd with Bees. So that if there were a Statute for Parish Bees, as well as Parish Butts, and Parochial Appiaries design'd for those places, where observed best to thrive, I know not why a Parish may not make as much Honey (as one Gentleman of *Norfolk*) *viz.* 300 *li. de claro*, as I heard *per annum*.

As for your design of feeding them (as that Gentleman in *Italy*) I conceive it here unfeaseable, or if it were it would not quit cost; I care not to feed them, except to save them in spring time, and strengthen them for work: Hearbs and Floures are but from hand to mouth, serve for Bee-bread: If Mill-dewes fall not, Bees thrive not, for they are, with Gods blessing, the Antidote to that Curse: As for your honest pity to that poor Creature (I shall try a Conclusion this Summer which may save some few Stalls, but in saving (poor Stalls) we dammage them, and (in saving the rich) our selves; the middle sort are best for store, and enough for those that are not covetous, with whom they seldom thrive, because they over act their part in sparing, as careless persons in their neglect of keeping them. I can and shall afford you what satisfaction you please, in any useful question, that concernes the welfare of their Common-wealth.

As for my transparent Hives, I have but two, which are not moveable, else you should willingly have them, whither you return'd them or not; they serve onely to give me an account of the daily income, and a diary of their Negotiations, whereby if I spend half an hour after dinner or supper, I know what hath been

been done that day; can shew my Friends the Queens Cells, and sometimes her person, with her Retinue; she afforded me 14. quarts, or neer upon, in one year, and if the rest afford ten a piece I think it a fair gain: there is not an Hive to be seen about my house, nor a child stung in a year: My Appiary consists of a row of little houses, two stories high, two foot apart, which I find as cheap at seven yeares end as straw hacles, and far more handsome: (where I have bay windowes I have a set of unseen Stalls) whose room is handsomly spar'd, and their company very harmonious, especially for those that lodge in their Chambers, whether they would wake or sleep, in so much as I have heard some say (that have there lodged) they would give twenty pound to have and here the like at home; the pleasure takes some, the profit others. But if either take off (and not take up) our hearts in minding the main, you and I may spare any farther enquiry about them.

Thus have I stept out of my way, to gratifie you in the exchange of Ink and Paper, and shall be ready so to doe in things of weightier concernment than B Bs. if you shall give the stroke, 'tis hard if my flint yeild not some sparks: all your Subjects are marvellously well pleasing to me, but above all, your most Ingenious and Publique Spirit makes me love and honour you; onely I fear your sweetnesse may be abus'd by some undertakers, that are apt to promise much upon the score of hopes and fancies,

But you will say, I have done enough for once to weary you, and if I find I have, I shall doe so no more, but rest,

Easlington in Glocester-shire *20th of* December, 1653.

Sir, your endeared Friend, to serve you,

WILL MEVVE.

A Letter, concerning that pleasant and profitable Invention of a Transparent Bee-hive, written by that much accomplish'd, and very ingenious Gentleman, Fellow of All-Soules *Colledge in* Oxford, *Mr.* Christ. Wren, *with the Figure and Description of the said Transparent Bee-hive.*

HONOURED SIR,

YOu have by several hands intimated your Desires to me, of having a particular Description of our three-storied-Bee-hive. I confesse I was not over forward to execute this command of yours; and my reason was, because the Devise not fully answering our own expectation, I thought it would be much more unsatisfactory to you: but since you please to persist in your desires, (as Mr. *Rawlinson* told me the other day) I can be no longer shameless to persist in my incivility, especially prompted by mine own Ambition, to find any way to shew my self a Servant to a Person so eminent amongst the *Ingeniosi* as your self.

The Description, I think, is evident enough in the Paper; I shall onely tell you what effects we find. Last *May* (as I remember) we put in two Swarmes together, leaving the places to goe in, open onely in the lowermost, but all the passage holes open from Box to Box: in the middlemost they first began their Combes, then in the lowermost, before they had filled the middlemost, and so continued till they had filled both, which before they had quite finished, they began to make two little Combes in the upper Box, (all this while deserted) and continued besides, a part of a Comb of the middle story an inch or two up into the upper box, filling almost the passage hole quite up, leaving themselves onely a little hole, as big as two fingers might go in, for their passage up and down: I am not very certain, whether this was not done at first when they wrought in the middle Box, and whether this was not the reason, why they wrought so little in the upper Box, because they stopped themselves up from an easie passage to it. The Combes in the lower stories were well repleniſhed with Honey, and suddainly, but these little Combes

in

in the upper they quite desert, contrary to our expectation, which was, that they would have wrought most in the upper story, and the middlemost, in which, when they had wrought enough for their own spending, that then we might take away the uppermost from them, and so have continued still: but if we find another year, that they fill not again the uppermost, it will be all one still to take away the lowermost from them, but if that be so, then two Hives will be sufficient. We must rather desire of you farther light in this business, which I presume you can afford us, from other mens Observations, that have tried the like Experiment, for as yet you see ours is imperfect, and we know not what to make of it.

Sir, I am
Your most obedient
humble Servant,

All-Soules Coll.
Febr. 26. 1654.

CHRIST. WREN.

a.b. a.b. a.b. 3 Octegonall Boxes exactly in all par-ticulars of one Shape & Size;

c. a hole in the top, w.ch is the same in every Box.

d. a Cover (the same to every hole) turning upon a pinne,

e.f. a Wiar, w.ch puls the Cover to close it upon occasion,

g.g.g. holes throug w.ch the ends of the wiars ap-peare,

h.h.h. the Dores, every one to be opened or shut by litle sliders the lower dores are open, the others shut,

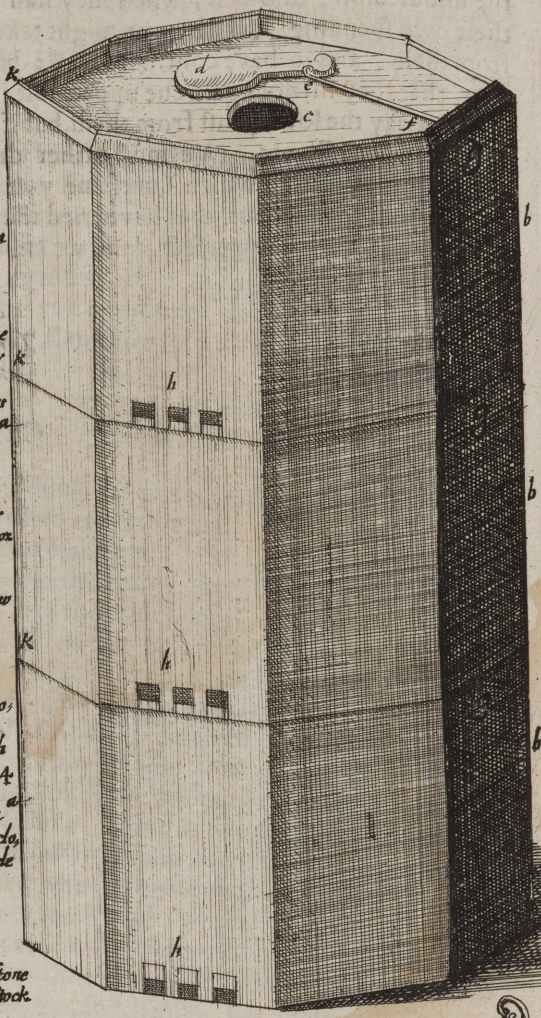
K.K.K. the vpper edges of every box, sloped away convexedly, the bottomes are likwise sloped away concauely, that any one Box may fit to any of the other two,

m. A litle Key made to screw on the ends of the wiars y.t appeare in the holes, by that meanes to close any of the holes,

In the sides behind oppo-site to the sides h.h.h. are dores that open with hinges & locks about 4. Inches one way & 6 the other; & within each a peece of cleere glasse clo-se cemented to the inside of the Box, to look in vpon occasion,

Each box is lined with Rush matt,

It standes in a Case of stone that serves both as a Stock & a Covering to it,



Scale of Feete & Inches.

1 2 3

Considerations upon the Letter from Oxford.

SIR,

Upon speech with Mr. *Greatrix* (according to your desires) I find, that the substance of what he intimated to you the other day, upon the sight of your Letter from *Oxford*, was no other than what truly my thoughts from my own reason, and the sight of Dr. *Brown's* Essay upon the same subject, confirmed me in: *viz.* that Bees, as they do naturally begin in the top of the Hive and work downwards, so do they not like that that top should be more than one, or at most two stories high. For as by the judgements of all that write of Bees, a valley is counted the best kind of seat for them, to the intent, that when they come heavy loaden home (as they do often in a day) their journey may be a descent, and consequently easie, so from the same reason ought the work within the Hive to be so ordered, as to be upon as little ascent as may be, or rather upon a descent. I mean, that it be so ordered, as that the Bees may go rather down than upwards within their Hive. Upon this ground my opinion is, that one Box is (at the beginning) sufficient, or but two at the most. When this one (if but one be used at first) shall be filled, it would (the entrance into it being first stopped, and the lower middle hole of it be left open) be set upon another lower Box, and when this second Box shall be also filled, a third would be set under the two first, and when the whole Body of the Bees is fully gone down into the third or lowest Box, then (and not before) may the first or upper Box be taken away; and after this manner may the upper Box still be taken away from time to time, as often as the lower shall be filled, and a new empty one put under. This I have gathered from such Books as I have met with, but that which from my own private judgement I offer as a further Addition is, that I could wish that the lowest Box should be still so placed, as to hang down through and below the planke or seat upon which Hives are ordinarily placed, so as that the Bees, when they come heavy loaden home, may go downwards into it. When this lowest Hive is almost full (which might be discovered through windows left for that purpose)

then

than would another empty one be put into its place, and the Box that is almost full so to be placed upon the empty one, as that the Bees may enter by a hole in the lower part of it, and (when it is absolutely full) go down into the lowest Box. And by this meanes the heavy loaden Bees (instead of carrying their loads three stories high, according to the *Oxford* practise) do still work either downwards, or very little upwards. I will conclude this Subject with an Observation concerning these little Creatures, *viz.* that their King weares no sword, I mean, hath no sting of their own, nor any *Janizaries*, nor other meanes of safety to themselves, than the loyalty of their Subjects.

Some remarkable Observations, concerning the swarming of Bees; together with a short Description of a Bee-hive made of Glasse.

ALthough Experience tells us, that Bees do naturally love to hive in woods and other places out of mens sight, and that chiefly at the time, when they send forth their numerous Swarms like so many new Colonies; yet notwithstanding, they may be brought so to part with that kind of wildness, as to give men leave to observe them, and to admire Nature, whose pleasure it is, in this contemptible sort of Insects, to make shew of the great riches of her Treasury. This is not hard to prove.

For it is known, that Bees, when they begin to swarm, and that the heat of the Sun hath drawn them out of their Hive, do fly about till their King (whom Nature hath wisely unarmed) doth by his sitting down determine the place of their Rendezvous, which they immediately take notice of, and all those huge numbers of them (being from that time forwards to make their own fortunes, and to be their own Purveyors) do pitch their Camp round about their King. Presently after which, a certain kind of Bees, which are commonly called Scouts, are sent out to discover places for them to hive; and till these Scouts return, the whole Swarm sits still to refresh themselves, being weary with flying at their first swarming. These Scouts at their return rush violently in upon the Swarm, and carry away to the place which they have found, some part of the Swarm, together with the King,

King, on whom depends the unity, good fortune and safety of them all.

In the Northern Countries, as *Poland*, *Lithvania* and *Muscovie*, men use to make Hives for them on purpose in the Woods and where such are the Bees chuse them, but if they can find none such, then they hive in old, hollow and rotten trees, and that for many yeares together, till the hollow place being filled with that excellent liquor of Honey, they are forced to go to some other place. So that many times those that fell wood do, when they little think of it, find in hollow trees great store of Honey.

It is remarkable, that most Swarms, as soon as they come out, do rest themselves in some place near to their old Hives, for two or three houres together, in which time, unless they have Hives provided them, they forsake their former Master, and betake themselves to the Woods and solitary places. But if they have Hives provided for them, they submit themselves to the Owners of those Hives, especially if their King (which is observeable) be shut into a little den made on purpose, and be kept there for three or four dayes together. In which time chiefly you may perceive a wonderful diligence in the Bees, and that it may be the better seen by such as are curious, and admirers of Nature, Industry hath shewed how to make Hives of Glass, which may be placed in Gardens, and other convenient places, and even in Windowes.

The manner whereof is this following.

Let great care be taken in the choice of the place; for Experience will shew, there lies much in that. It will be best for this purpose to chuse a window towards the Sun-rising, for by this means, the Bees will have their industry quickened, which from the very Sun-rising will set them to work, they being Creatures so intent upon their business: and besides, it will free the poor weak things from many inconveniencies. It will be otherwise, if you chuse for this purpose a place towards the West or North, for the light of the rising-Sun, coming but late upon a place that is towards the West, will make the Bees go late to worke, and the North with its natural sharpness will weaken and shrink up the tender bodies of those little Creatures,

they delighting in heat: so that the East and the South are for this purpose farre better than the other two quarters of the world.

Having so chosen the place, let there be made an Hive of about a yard high or a little more, after this fashion. Fasten four little pillars of wood in two boards, one on the top and the other at the bottom, and let the pillars be answerable to the height of your window, and let that side of the Hive, which is to be towards the air, be half a yard broad, and the other side, which is to be towards your chamber, a quarter of a yard broad. In that side which is towards the air, you are to leave a slit of about two fingers breadth, for the Bees to fly in and out at, and in the middle of that slit you must put a cross peice of wood, which must be very well fastened, that it slip not up and down, and so crush the Honey-combes, but that it may the better bear the weight of them. In the inner side of the Hive, you are to make doors about a quarter of a yard broad, and well and strongly bolted, that the Bees may be kept from flying into your chamber. Through these doors you are to put in your Swarm, and take out your Honey. And for the space between the aforesaid pillars, you may have it closed either with whole glass, or with smaller peices leaded; or if you will have the whole Hive of glasse, the Glass-makers can make it for you, but you must observe the Conditions before expressed.

Having thus prepared all things, you may place the Swarms where you intend to have them in the Hive, and with delight behold their work, and in a kind of rapture cry out, That the world is the great book of God, containing three leaves, *viz.* Heaven, Earth and Sea, wherein there are so many characters of the wisdom of God as there are Creatures.

A singular Observation concerning Bee-Hives and Buck-Wheat, in reference to Bees, made by Mr. Thomas Babington *in his Travels into* Germany.

IN *Kempen-Land* in *Germany* I have seen about fourty great Bee-Hives, which contain, when they are full, about seventy pound weight in Honey, placed near a great field sown with Buck-

Buck-Wheat, and it was related to me of a truth by the Inhabitants, that the Bees did suck such plenty of Honey out of it, that in a fortnights time the said Hives were all filled therewith.

The said Buck-Wheat is a three square grain, which when it is ripe is made use of for Pan-cakes, and to brew Beer, and excellent good to fatten Hogs with, and in blowing time of singular use for Bees.

How to make good Greek, or other Wines out of Honey.

AS concerning the passage in my Letters concerning Honey, I cannot exactly give you an account of it, till I see all the Discourse: Thus much I remember and know by experience, that if pure Honey be gently boiled in pure water, and well scummed, and afterward cooled, and then with barm or yest set to working, as we usually do Beer or Ale, and then put into a larger vessel for a time, and afterwards drawn into pottles, that a liquor hath, and may be made like fountain water, yet of such a fine excellent tast, and so strong, that some, who have thought themselves of very good pallats, have mistaken it for Greek Wine.

And I question not, but Sugar will do the like, but whether I seem to speak of any more ingenious clarifications, as with white of Eggs, with salt of Tartar, or with other things, that Vintners use for their Wines, or whither I refer them to *Glauber*, who in his Appendix speaketh of some ingenious fermentations and clarifications, I cannot certainly tell. But this I dare boldly say, that if any Gentleman would trie Experiments upon Honey, Sugar, yea, or any sweet things, if the sweetness be not too flashy and watry, he shall find divers things both delightful and profitable.

I hope *Glauber*, who hath promised divers things in these kinds, and I suppose is most able to accomplish them, will more clearly manifest them for the good and comfort of our Northern Countries.

I desire to hear what other ingenious things are written of late. I think these times very fruitful, and that the great Se-

crets, which have a long time been hid, will shortly be manifested.

A Receipt to make a pure Mead that shall taste like Wine.

TAke one part of clarified Honey, and eight parts of rain Water, or other clear Water, and boil them well together in a copper vessel, till half the liquor be boiled away, but while it boiles, you must take off the scum very clean, and when it hath done boiling, and begins to cool, tun it up, and it will work of it self. As soon as it hath done working, you must stop the vessel very close, and bury it under ground for three months, which will make it loose both the smell and taste of the Honey and Wax, and will make it taste very like Wine.

Another way to make a most pleasant and Wine-like Mead.

TAke of clarified Honey twenty pound, and of clear Water thirty two gallons, mingle them well together, and boil that liquor half away, and take off the scum very clean, when it hath done boiling, and begins to cool, put it into a vessel, where hath been Rhenish wine before, and put to it four gallons of Rhenish wine Must, and let it work; then stop the vessel very close, and bury it under ground for two months together, at the end of which draw it off the lees, and put it into another clean sweet vessel by it self, and it will be very like Wine; and if you would have it of an aromatick taste, you may put these following ingredients into the vessel at first, and let them work with the liquor, *viz.* of floures of Elder, Rosemary and Majoram, each one handful, of Cinnamon two ounces, of Cloves six ounces, of Ginger, Pepper and Cardamome, each two scruples, these will give the Mead a most pleasant taste.

The

The Common-wealth of Bees.

Represented by Mr. *Gerard Malynes*, by way of a digression in his great Book called *Lex Mercatoria*, or the Antient Law-Merchant.

LEt us somewhat digress from Manufacture to Apifacture, and (with *Solomon* the wise) send the sluggard to imitate the painful and laborious Bees, for the increase of Honey and Wax in *England*, *Scotland* and *Ireland*, and other of his Majesties Dominions: and let mans help succour this Apifacture, if it may be so called, as followeth.

The meanes to increase Honey and Wax, doth properly consist in the preservation of Bees, and the making of convenient Skepes or Bee-hives after a new invention: Namely, you may make your Skepes either with Straw or Wicker of Two sorts, and to be of two peices, to take off at the crown, or near the midst of the Hive; that when they have gathered and filled up their house, and that the room is scant within, then take away the upper half, and clap on a board, or the bottom, or head of a pitch Barrel, or tar barrel, or the like, having pitch on it, casting Mault meal, or Bean meal upon the same; and then daube it well with clay about the skirts, and setting on with your clay mixt with some salt; and when you have thus done, then raise it up below with so many wreythes, as you took above for the gelding of your Hives before, which is very needful to make the greater plenty and increase: For making your Skepes in this manner, the Honey may be taken at all times; but especially, when you do perceive by the lifting up of your Skepes, that your Bees are well provided for the Winters provision, and that there be

be plenty of food yet to gather, then cap them. Take a ſtrong wyer, make it flat, and cut your combes in two, and then have a parchment in readineſs to follow the wyer, to keep aſunder the wax from cleaving, laying on your board with pitch and meal, as aforeſaid. This to be done in Summer.

Preſervation of Bees for the Climate of Great Brittain, &c.

1. IN *March* your Bees do begin to breed, and then they begin to ſit, let them at that time be ſerved twice every week, becauſe:

2. In *Aprill* your Bees begin to hatch, ſerve them in hard and rugged weather, whereby they are hindered to be abroad.

3. In *May* your Bee comming forth, look to ſerve them until Mid-*May*.

4. In *June* are your Bees in their ſtrength for caſting, and then there is great plenty of Floures and Dews to feed upon.

5. In *July* they are full of Honey, therefore cap your firſt ſwarmes, and take up the reſt for Honey that you mean to take up for that year, and cap as followeth.

6. In *Auguſt* is the moſt breed of Bees paſt, and you may cap likewiſe thoſe you mean to keep over the year; I mean your old Stocks, for then they may forbear it.

7. In *September* the gathering of Bees is paſt; ſtop cloſe, and if there be any that is not capable, leave them and ſtop cloſe with clay and ſalt, and daube below with Cow-dung, as the manner is.

8. In *October* begin to look whether robbers have ſpoiled any or not; if it be ſo that they have, take away your Bees as in Honey time, and ſet up your Skepes with the combs whole, to be uſed as hereafter followeth.

9. In *November* ſtop up all holes, let none paſs in or out; but if they prove weak, then take away your Bees from the combs, and keep them for the ſecond and third ſwarms after.

10. In *December* houſe your Bees, if they ſtand cold: and in the North houſe all.

11. In *January* turn up your Bees, and throw in Wort, and Water, and Honey twice or thrice, but let your water be warm.

12. In

12. In *February* set forth and serve all them that stand in need, with wort and honey, or honey and water, so it be warm; and then in *March* look for their breeding, as is before declared.

No corrupt combes to be left, but the bad are to be taken forth in the Spring time (being in feeding) and when you have thrown in one pint of warm wort, and that they are struggling with the clammines of the wort; then may you very well take from them any thing that doth annoy them; which manner of dressing you may observe for many yeares during your Skepe, so long as they stand to work new again.

Necessarie observations concerning the Premisses.

FRom the middle of *Aprill*, until the middest of *May*, look diligently to thy Bees; for then are they near beginning to hatch, and do stand in need of most help, especially if the Spring be cold, and the wind holding any part of the North or East; whereby the tender buds or blossomes do perish, and the Bees are driven to the blossomes of Apple-trees, which is their utter overthrow and decay.

Helps for weak Bees at all times.

TAke Water and Honey mixt together made luke warm, and throw it amongst the combes, to the quantity of a pint at a time: or strong wort new run, or unboiled wort also luke-warm, and the same two or three times at the most; and this for the first Swarm.

For the second and third Swarm must be given in their Hives, to preserve that which they have gathered: Take Mulce, which is eight times so much water as honey, boiled to a quart or three pints; set the same with dishes in their shepes, laying a few straws in the dish to keep them from drowning. Wort and Figs boiled will serve also.

The Smoak (as it were the Tobacco of Bees) wherein they delight, is Cows or Oxen dung, sophisticated with sweet wort; and the marrow of the Oxe or Cow, being well dried: take the

Shepe

Shepe (which is diseased) and set it in a meal skiffe or riddle, and then kindle a little fire with your Cows dung, and set them over the smoak of the fire, and so smoak them by fits, scarce so long at every time as you can tell ten, and beware not to use this smoaking too oft, but as necessity requireth, and in gentle manner.

The necessary use of Honey and Wax, made me to observe the premisses, wishing, That in all Parishes of Great *Brittain* and *Ireland*, all the Parsons and Vicars in Country Towns and Villages, were injoyned to keep Bees for their own benefit, and the general good, which they may do conveniently in the Churchyards, and other places of their Gardens, and some of their children or schollars may attend the same.

The multiplying of Bees is easie without destroying them, and creation of them is known to many, proceeding of the corruption of a Heyfar, the flesh whereof is fit to ingender Bees, as the flesh of Horses for Wasps, or that of Man for Lice. And to abbreviate, I do refer the desirous Reader hereof to Mr. *Hill* his book of Husbandry, where he speaketh of Bees, with the commodity of Honey and Wax, and of their uses and several profits, collected out of the best learned Writers, as *Plinius*, *Albertus*, *Varro*, *Columella*, *Palladius*, *Aristotle*, *Theophrastus*, *Cardanus*, *Guilielmus de Conchis*, *Agrippa*, and others.

Some

Some VVriters of Bees extant in Englisth.

THe Feminine Monarchy, or the History of Bees. Shewing
Their admirable Nature and Properties;
Their Generation and Colonies;
Their Government, Loyalty, Art, Industry;
Enemies, Wars, Magnanimity, &c.
Together with the right ordering of them from time to time, and the sweet profit arising thereof.
Written out of Experience by Charles Butler, Magd.
Plat. in Trucul. Act. 2. Sc. 6.
Pluris est oculatus testis unus, quam auriti decem.
Oxford, Printed by William Turner, for the Author. 1634.

A Book promised by Henry Gurnay, Gentleman.
Wherein is shewed what great losse cometh to the Common-wealth, by the neglect, carelesnes and ignorance in the keeping of more store of Bees, and the right ordering them to most profit, partly shewed in, that some Man having a score of Shepes, and his next neighbour not any, or happily, not three in that Town of an hundred Housholds as many more: and that some Country is very plentiful thereof, and the next every way as apt for that commodity, yet very scarce thereof; and yet the air and the year equally indifferent to all alike, the common errour being to ascribe a greater luck in these kinds to some men more than to others, which is onely through an unskilfulnes therein.

The

The Ordering of Bees.

Or the true History of Managing them from time to time, with their Honey and Wax, shewing their Nature and Breed.

As also what Trees, Plants and Hearbs are good for them, and namely what are hurtful: together with the extraordinary profit arising from them, &c.

Set forth in a Dialogue, resolving all doubts whatsoever.

By the late unparallel'd experience, of JOHN LEVETS, Gent.

London, Printed by Thom. Harper, for John Harison, 1634.

A Treatise concerning the right use and ordering of Bees.

Newly made and set forth, according to the Authors own experience: (which by any heretofore hath not been done)

By Edmund Southern Gent.

Imprinted at London by Thomas Orwin, for Thomas Woodcock, dwelling in Pauls Church-yard, at the sign of the black Bear. 1593.

A Discourse or History of Bees.

Shewing their Nature and Usage, and the great profit of them.

Written by Richard Remnant.

London, Printed by Robert Young, for Thomas Slater, dwelling in Duck-lane at the white Swan. 1637.

FINIS.

THE REFORMED VIRGINIAN SILK-WORM,

Or, a Rare and New

DISCOVERY

OF

A speedy way, and easie means, found out by a young Lady in *England*, she having made full proof thereof in *May*, *Anno* 1652.

For the feeding of Silk-worms in the Woods, on the Mulberry-Tree-leaves in *Virginia*: Who after fourty dayes time, present their most rich golden-coloured silken Fleece, to the instant wonderful enriching of all the Planters there, requiring from them neither cost, labour, or hindrance in any of their other employments whatsoever.

And also to the good hopes, that the *Indians*, seeing and finding that there is neither Art, Skill, or Pains in the thing: they will readily set upon it, being by the benefit thereof inabled to buy of the *English* (in way of Truck for their Silk-bottoms) all those things that they most desire.

LONDON,
Printed by *John Streater*, for *Giles Calvert* at the *Black-Spread-Eagle* at the West end of *Pauls*, 1655.

TO THE Reader.

Ingenious Reader,

I *Have in my Legacy of Husbandry bequeathed some-thing unto thee concerning Silk-worms, which hath wake-ned many to search after the means to advance that part of Husbandry. But because the Letter of King* Iames *to the Lords Lieutenants of the severall Shires of* England, *for the increasing of Mulberry Trees, and the breeding of Silk-worms, for the making of Silk in this Nation, had not annexed unto them in that Treatise the Instructions ten-ding to that purpose, and being but few, wholly out of print, and very much desired: I thought good upon the occasion of the printing of this Letter to those of* Virginia, *to publish it also for the benefit of those who shall be willing to employ themselves in this way of industry, which seemeth to be brought unto a more perfect and speedy accomplishment than heretofore hath been known either here or in* France, *as by the contentes of this adjoyned Letter (wherein the Experi-ment of a vertuous Lady of this Nation for the breeding of Silk-worms, is addressed unto the Planters of* Virginia) *is set forth to encourage both them and others to set upon this work, to benefit themselves and the Nation thereby. And truly the Gentleman who doth addresse this Letter to the Planters of the Virginian Colonie is much to be commended for his affection to the publick, because he doth not conceal (as some Muck-worms do for private ends) the Advantages*

which may be reaped by singular industrious Attempts or experiments of profit; but desires the benefit of others, even of all, to be encreased. And it were to be wished, that every one to whom God (from whom comes every good & perfect gift) doth impart any rare and profitable Secret of Industry, would open himselfe towards his Brethren, as this publick-hearted Gentleman doth; then would all hands be set a work, and every one would become instrumentall to serve himselfe and his Neighbours in Love, and overcome the burthen of povertie, which for want of employment and decay of Trade, doth lie so heavie upon very many, whose burthens might be either born, or made easie, if all the gifts of God were made use of, for the end for which he doth bestow them, namely, to profit withall towards others, as it becommeth the Members of the same Christian, and Human, and Nationall Society; for the same rule holds in all these respects among such as understand what it is to be a good Commonwealths-man in the State, as well as in the Communion of Saints: And to this good and generous inclination, which I wish may more and more abound in them with the grace of God, I shall leave thee and rest,

Thy most assured and faithfull servant,

SAMUEL HARTLIB.

Instructions *for the increase and Planting of* Mulberry-trees.

What ground is fit for the Mulberry-seeds, *how the same is to be ordered, and in what sort the seeds are to be sowed therein.*

THe ground which ought to be apointed for this purpose, besides the natural goodness of it, must be reasonably well dunged, and withall so situated, as that the heat of the Sun may cherish it, and the nipping blasts of either the North wind or the East, may not annoy it: The choice thereof thus made; that the seeds may the better prosper, and come up after they be sown, you shall dig it two foot deep, breaking the clods as small as may be, and afterwards you shall divide the same into severall Beds of not above five foot in breadth, so that you shall not need to indanger the Plants by treading upon them, when either you water or weed them.

The Mulberry seeds you shall lay in water for the space of 22 hours, and after that you shall dry them again half dry, or some what more, that when you sow them they may not cleave together: Thus done, you must cast them upon the foresaid Beds, not altogether so thick as you use to do other garden Seed, and then cover them with some fine earth (past through a Sive) about half an inch thick. In dry weather you shall water them every two dayes at the farthest, as likewise the plants that shall come of them; and keep them as clean from weeds as possibly you can.

The time in which you ought to sow them for your best advantage, is either in *March*, *April*, or *May*, when frosts are either altogether past, or at the least not so sharp, or of so long continuance, as to indanger their upspring.

There is yet another way to sow them, and that is as followeth: you shall (being directed by a strait line) make certain furrows in the Beds above mentioned, of some four fingers deep, & about a foot in distance the one from the other: After this, you shall open the earth with your hands, on either side of the aforesaid furrows, some two fingers from the bottom, and where you have so opened it, shall you sow your seeds; and then cover them half a finger thick with the earth which before you opened.

When the Plants that are sprung up of the Seeds, are to be removed, and how they are to be planted the first time.

IN the moneths of *September*, *October*, *November*, *December*, *March*, or *April*, the next yeer after the Seeds are sown, you may remove their plants, (or in the moneth of *January*, if it be not in frosty weather) and set them in the like Beds as before, and about one foot the one from the other, but first you must cut off their roots about eight inches in length, and their tops about half a foot above their roots, more or lesse, according to the strength of the said plaints, for the weaker they be the lesse tops you shall leave them. In this sort you may suffer them to remain weeding and watering them (as need shall require) till they be grown six foot in length above their roots, whereunto when once they have attained, you may cut their tops, and suffer them to spread, alwayes having a care to take away the many branches or succours, that may any way hinder their growth untill they be come to their full length of six foot, as aforesaid.

When, and how the Plants are to be removed the second time, and in what manner they are to be planted where they shall remain.

IN the moneths aforesaid, (according as your plants are waxen strong) you may remove them either into the hedges of your fields, or into any other grounds. If in hedges, you must set them 16 foot the one from the other: if in other ground, intending to make a Wood of them 18 foot at the least

least. But a moneth before you do remove them, you must make the holes (wherein you purpose to set them) about four foot in breadth, and so deep as that their roots may be well covered, and some half a foot of loose earth left under them, having alwayes a special care so to place them, that they may receive the benefit of the Sun, and not to be shadowed or over-spread by any neighbouring trees.

When and how the Eggs of the Silk-wormes are to be hatched, and how to order the Wormes that shall come of them.

WHen the leavs of Mulberry-trees begin a little to bud forth, take the eggs of your Silk-worms, and lay them in a piece of Say, or such like stuff, and in the day time carry them in some warm place about you, in a little safe box, but in the night either lay them in your bed or between two warm pillows, untill such time as the Wormes begin to come forth: then take a piece of paper of the wideness of the said box, and having cut it full of small holes, lay it within the same upon the eggs, and upon that again some few Mulbery-leaves, to which the Wormes as they are hatched, will continually come. These leaves with the Wormes upon them, you must still remove into other boxes, laying fresh leaves as well on those that are removed as on the paper where the eggs are; and this is the course which must be duly kept and observed, untill such times as all the Wormes be come forth of their shels, still keeping their boxes warm, as aforesaid; but no longer about you, but untill the Wormes begin to come forth, out of which boxes you may safely take them, when once they have past their second sickneſse, and feed them upon shelves of two foot in breadth, and 18 inches one above the other.

The said shelves are not to be placed in any ground-room, nor yet next unto the tiles, but in some middle room of your house which openeth upon the North and South, that you may the more conveniently give them either heat or aire, according as the time and season shall require. Besides you must not make them close unto the Wals, but so as you may passe

passe about them the better to look unto the Wormes, and keep them from Rats and Mice, which otherwise might devoure them. You must observe the times of their comming forth, and keep every one, one or two dayes hatching by themselves, that you may the better understand their severall sicknesses or sleepings, which are foure in the time of their feeding. The first commonly some twelve dayes after they are hatched, and from that time at the end of every eight dayes, according to the weather, and their good or ill usage, during which time of every sickneſſe, which lasteth two or three dayes, you must feed them but very little, as onely to relieve such of them, as shall have past their sickneſſe before the rest, and those that shall not fall into their sickneſſe so soon.

The whole time that the Worms do feed, is about nine Weeks, whereof untill they come unto their first sickneſſe, give them young Mulbery-leaves twice every day, but few at a time; from thence untill their second sickness, twice every day in greater quantity; and so from their second to their third sickneſſe, increasing the quantity of the leaves, according as you perceive the Wormes to grow in strength, and clear of sickneſſe: from the third untill their fourth sickneſſe, you may give them leaves thrice every day, and the fourth being past, you may let them have so many as they will eat, alwayes having a care that you give them none, but such as are dry, and well aired upon a Table or cloth, before they be laid upon them, and withall gathered so neer as may be; at such times as either the Sun or Winde hath cleared them of the dew that falleth upon them.

For the feeding of Worms you need observe no other order then this, lay the Mulberry-leaves upon them, and every two or three dayes remove them, and make clean their boxes, or shelves, unleſſe in times of their sickneſſe, for then they are not to be touched; the leaves which you take from them when you give them fresh to feed upon, you must lay in some convenient place, and upon them a few new leaves, to which the Worms that lay hidden in the old, will come, and then you may passe them with the said new leaves

to

to the rest of the worms: And now lest any thing should be omitted, which serves to perfect the discovery of so excellent a benefit, I will advise you to be very diligent in keeping clean their Boxes, or shelves, as being a speciall means whereby to preserve them; wherefore when you intend to do it, you shall remove them together with the uppermost leaves whereon they lie, unto other boxes or shelves, for with your hands you may not touch them, till they have throughly undergone their third sickness, and then may you passe them gently with clean hands, without doing them any harm: provided that the party that commeth neer them smell not of Garlick, Onions, or the like. The first five weeks of their age you must be very carefull to keep them warm, and in time of rain or cold weather, to set in the room where they remain, a pan with coals, burning in it now and then some Juniper, Benjamin, and such like, that yieldeth sweet smels. But afterwards unlesse in time of extraordinary cold, give them aire, and take heed of keeping them too hot, being alwayes mindfull to store the room with herbs and flowers which are delightfull and pleasing to the smell. As the wormes increase in bigness, you shall disperse them abroad upon more boards, or shelvs, and not suffer them to lie too thick together: and if you finde any of them broken, or of a yellow glistering colour inclining to sickness, cast them away, lest they infect the rest, and sort such as are not sick, the greatest and strongest by themselves, for so the lesser will prosper the better.

When and how to make fit rooms for the worms to work their bottoms of silk in, and in what sort the said bottoms are to be used.

AS soon as by the clear amber-coloured bodies of your worms, you shall perceive them ready to give their silk, you must (with heath made very clean, or with the branches of Rosmary, the stalkes of Lavender, or such like) make Arches between the foresaid shelves.

Vpon the branches and sprigs whereof, the wormes will fasten themselves, and make their bottoms, which in fourteen dayes after the worm beginneth to work them, you may

take away; and those which you are minded to use, for the best silk, you must either presently winde, or kill the worms which are within them, by laying the said bottoms two or three dayes in the Sun, or in some Oven after the bread baked therein is taken out, and the fiercenes of the heat is alaid. The other bottomes which you intend to keep for seed, you must lay in some convenient warme place, untill the worms come forth, which is commonly some sixteene or twenty dayes from the beginning of their work: and as they do come forth you must put them together upon some piece of old Say, Grogeran, the backside of old Velvet, or the like, made fast against some Wall, or Hangings in your house.

There they will ingender, and the Male having spent himselfe, falleth down, and in short time after dieth, as also doth the Female when she hath laid her egges, which egges, when you perceive them upon the Say or Grogran, &c. to be of a grayish colour, you may take them off gently with a knife, and having put them into a piece of Say or such like, keep them in a covered box amongst your woollen cloaths, or the like till the year following: But not in any moist room, for it is hurtfull for them, neither where there is too much heat, least the wormes should be hatched before you can have any food for them.

The making of a Wheel, as likewise the way to winde the said silk from the bottoms, can hardly be set down so plainly, as to be rightly understood: Wherefore when time shall serve, there shall be sent into every County of this Kingdom, a Wheel ready made, and a man that shall instruct all such as are desirous to learn the use thereof: Till when, I will commend these brief instructions to be carefully considered of all such as are willing to benefit either themselvs or their Country, that being skilfull in the Contemplation, they may the readier, and with less errour apply themselves to Action, which painfull industry, with Gods assistance, will quickly perfect.

An Extract of a Letter from Germany, *concerning Silk-worms, written to* S.H, *Esquire.*

AS for keeping of Silk-worms I must confess I have spent likewise some time in the ordering and observing of them inasmuch as this very yeare (1653) I have had from them so much good Silk (and equal to that which is brought either out of *Persia* or *Italy*) as have made mee two paire of Stockings. And I have found by experience that they may be kept as well in *Germany* as in other Countries, and that Mulberry-trees will grow in abundance upon our Lands; wherefore I have often wished that the Emperour (of *Germany*) would follow the most laudable example of the K. of *France*, who having forbidden the importation of foraigne Silk into his Kingdom hath thereby so much obliged the industry of the People of *France*, that they are come to a great perfection in this Silken Manufacture. But concerning the Experiments of making Silk out of Nettles or out of Flax, I never have tried either of them. Only I remember that I have seene once a very fine and delicate yarne or thred, which was made purely out of Nettels. I do not believe, that those Artist of *Hamburg* and *Wolfenbuttel* which you have named unto mee in your Letter, will communicat their Skil for a publique good, as long as they can get their own comfortable subsistance by it.

A Letter written by Mr. Ra. Austen, *from* Oxford, *Febr.* 18. 1654. *Imparting his Experiments about Silk-worms and how to wind off the Silk from the Bottoms, when the Worms have done spinning?*

COncerning my experiences about Silk-worms, I only say thus much. That I am fully satisfied upon good and sure grounds that the keeping of them (store of them) in these parts would be of very great profit, could we but get Mulbery leaves sufficient to feed them. For upon my own knowledge and experience (last yeare) upon some thousands of them, I see what

might be by more. For my great doubt and question was satisfied about the winding of the Silke from the Bottoms, when the Worms have done spinning. I plainly see it is very easy, Children of 6. or 7. yeares old can apprehend it, and do it. For the Worms having done spinning, which is within 4. or 5. dayes of their beginning, through out-most silke is ravelled off, and the end is found immediately, which runnes on (5. or 10. or 16. or more bottoms together) in a bason of water, a little gum drag mixed. Some Bottoms (if the Worms were strong and well fed) run without breaking, scarce once or twice till all be off, and such as break, are quickly found again. The truth is, if the Worms are scanted of leaves, their silk is so small, that it holds not so well as that of lusty Worms. I saw many brave Skains of Silk wound off the last yeare, and help't to do part of it my self. Now the great matter is, How to propagate Mulberry-trees enough. As for the ordinary way, by boughes, we can have but few that way. I am from time to time experimenting other wayes by Seed, Inoculating, Grafting, &c: what will be the result, as yet I know not: I doubt not, but God will in his good time bring to light and set on foot many good and worthy designes, more then are in these Nations. We had need to labour to be of the like Principles of that worthy person, whose Paper you enclosed, patiently and humbly to waite the Lords season, and to designe for God in all we go about, which will crowne our endeavours with comfort and success.

A Rare and new-discovered speedy way, and easie meanes of keeping of Silk-worms, being thus made knowne to the Colony in VIRGINIA.

HEarken wel you beloved Planters, to what in these few lines I shall declare unto you; and is thus sent you in Print, that all of you may communicate the great and superlative good and benefit will be unto every one of you: *who so is wise, will ponder these things*, and give the praise and glory to God, the Author of all good Inventions; how Providence having

ving brought this to pass for all your exceeding great happines and increase of store of wealth, with so much ease, so little labour, no cost unto you; and in so short a time as fourty daies, this wealth flowes in upon you.

You now I conceive desire to know it, and I am as willing to impart it unto you: thus then in brief, in a plain manner, that all may understand it,

The way speedy weal was by sor hundreds you to remo some 60 mi miles South by land, a to attempt t discovery of the Wester Sea, on the border of V gin a, and both two ve easily atch ved, &c.

The same Lady, who last year sent you her Books of *Health and Wealth*, (who hath the happiness to beare the honourable name of your incomparable Countrey) continuing her sincere affections to the advancing of your welfares in all kindes; and amongst the rest in this rich work of Silk, knowing *Virginia* to be in all respects most proper for it, (as by a late Book sent you, published by Mr. *Williams*,) not onely in regard of the Climate being the same with *China*, from whence the infinite quantity of silk comes, but abounding (as it doth) with Mulberry-trees naturally growing there, and exceeding it by the Silkworm-bottoms found in her Woods. She hath I say this Spring found out (by the speciall blessing of God upon her intentions) so rare, so speedy, and so costless a way and means for the feeding of Silkwormes; by the triall and experiment she so luckily made, to the admiration of all that have seen or heard of it, as a thing scarce credible; because not heretofore thought of, nay, as it were, held impossible by such Authours as have written of the ordering and feeding of Silk-worms: that this her invention being thus made known unto you, her beloved friends in *Virginia*, she is most confident, and assures herself you will all there instantly without further delay (which will be the joy of her heart) become great and rich Masters of this noble Silk-work to all your unspeakable wealth.

The lady ha of these Si bottoms in I Cabinet as Jewels to c vince the credulous, they are ten times bigg then any in Europe to miration, of infinite i courageme to the work

Do but as she hath done; follow but with good courage your cheerfull leader, and doubtless you shall finde (what she desires you may,) namely, *Great profit and pleasure* in an honest imployment. This Silken-Mine will be to you of more benefit then a Mine of silver.

In the beginning of *May* last 1652, when her young Mulberry-tree in her Garden began to put out its buds, then her

Contrary t Book Rule

Silkworm-eggs began to hatch, as the nature of this wise creature is, when her food begins once to appear, she comes forth of her shell: she pre ently laying a Mulberry-leafe upon these little crawling creatures, they came all upon it instantly; then she carried the leafe and them upon it to the tree, upon whose leaves they made haft to be; and there they day and night fed themselves, creeping from leafe to leafe, and branch to branch at their own liberties most pleasing to themselves; they grew and thri ed wonderfully, and surpassed in largne's of body tho e other wormes she kept in her chamber (she having been many a year a Mistris of Silkworms, and kept them by the Book-rules) this good and prosperous beginning heightened her hopes. The wormes, as their nature is, cast off or slipped out of their skins four severall times, still growing greater and greater to the singular delight and content of their Mistris. About 45 dayes thus feeding upon the leaves, they began that rare and glorious work of spinning their Silk-bottomes upon the lea es and branches of the tree; such a gallant sight to behold, it ravished the Spectators, and their Mistris joy was crowned with excess of happiness herein and hereby, apparently finding the incomparable felicity this would prove to her dearly beloved *Virginia*, (for so you must give her leave to call it,) for she concluded, and so must all you, that this being thus effected in *England*, how much more with assured confidence will the wormes live, feed, and spin in *Virginia*? she upon erious and due consideration of this thing, gave God hearty and humble thanks.

And what can any of you now wish, for more incouragement? the full proof is made, the work (or rather let me call it) the pleasure is effected with so much ease, so little cost, hazard or pains, as all may admire it.

'Tis not the hundreth part of your care, labour, or toyl you take about your Tobacco, and an hundred times (as I may say) all things put together more gain and profit to you then you make by Tobacco, which in truth is but smoak and vapour, but this a reall-royall-solid-rich-staple Commodity.

And yet if you will have still smoak, so this neither will nor can hinder your labour in that, or take from you any other employment you have a minde unto. Consider,

Consider, consider I pray you (beloved friends) your incomparable happiness in this thing, and bless God for it. Surely I should much wrong your judgements and patience if I should spend any more arguments to perswade you to this so great benefit to you, and should be like to him that to manifest the clear Sun-shine at noon-day, brought in a candle.

In a word, there's nothing is or can be wanting but your true thankfulness to God for compleating this happy invention, and your present speedy putting it in practice.

Yet give me leave, before I bid you adieu, to add the incomparable joy this Lady hath, who is confidently perswaded (her daily prayers are to God for it) that this new invented way of thus keeping Silkworms on the Trees; it requiring neither skill nor pains, (this last being the only *Remora*, in the Savages nature, which witholds them from attempting any thing of labour) that when the Indians shall behold and see you begin the business, they will with all alacrity set upon it likewise, and imitate you. And that you to incourage them (as well you may) do agree with them, that for every pound-weight of Silk-bottoms they bring unto you, you give them (as well it deserves) 5 *shil.* worth in any Commodities they desire.

And thus by the blessing of Almighty God, there may be good hope of their civilizing and conversion; so that they may be likewise great gainers both in body and soul by this thing. And if this prove so, (Gods mercies and workes being far beyond our capacities) how much then indeed will *Virginia's* happiness be every way raised to the height of Blisse. The promise being made, *That they that be wise shall shine as the brightness of the Firmament, and they that turn many to righteousnesse, as the stars for ever and ever*; which the God of wisdome and power grant to you all in *Virginia*, and so, Lord, prosper this work in their hands, Lord, prosper their handy-work; good luck I wish you all in the name of the Lord, *Amen, Amen, Amen.*

Memorandum, that you take notice, that the Birds will eat up the Silkworms on the trees, so that care must be had (and it's easily prevented by severall wayes and means, as you will de-

devise) to scare away the birds; if all fail, a boy may be set that may affright them them al away with some noise, or by nets encompassing the trees, and the birds will also carry the Silk-bottoms off the trees, if they be let there remain; but thats soon prevented, by taking them speedily away. And this of the birds is the chief reason, that *Virginia* abounds not with plenty of the naturall wilde Silkworms, they devouring most of them: and it's a wonder how any at all escape them, but that God preserves some few of the race, that his power and wisdome may be seen, and the aptnesse of the Countrey to invite you to the work.

For their Bottom being ten times bigger then ours, what mighty great Worms must they be, and what incouragement is this to the businesse, and how much more silk they make then ours, &c.

It will be good for you to incourage the Savages, when they finde any bottoms in the woods, to bring them to you, that you may get of the race, and seed to increase it. Some say, the originall Silkworm is produced by the corruption of the old Mulberry-tree and leaves, by the Sunne and moisture. But that none of you may want a stock to begin your Silk-work, the Lady aforesaid hath sent you store of Silkworm-eggs to be distributed amongst you: and if you begin but with an 100 eggs this year, they will next year be above 1000; for one female Silk-fly will lay 3, 4, 500 at a time, all things more and more concurring to your incouragement.

Till you can get and gain the Egg and Seed of your naturall gallant large Silk worm: which is chiefly that you must endevour to store your selves with, no Eggs comparable to it, &c.

Now the two Propositions that tend to infinite welfare, benefit, and wonderfull advantage both to *England* and the Colony joyntly, are those that follow, they which upon no terms are to be omitted to be published and effected.

First, that with all speed some kinde of Coyne be sent to *Virginia*, that may be authorized to passe there for their Commerce and better trading. But whether all silver somewhat valued above its worth, or part silver and part copper, is left to the wise judgments in that case. But of this confidently be assured, that without some kinde of coyn or other, that Colony can no way prosper or thrive, nor any staple-commodities be set up, or Artificers in any kinde follow their professions: for Tobacco being now their money, and that with which all Commerce is driven, and paiments made in, and passeth from man to man; all men are set upon that thing with the neglect of all other rich and solid innumerable Commodities that are

in

in that land to be had: and till this remedy of Coyne be applied, there can be no prosperity in that Colony. Were not the thing as apparent to all mens understandings as light is from darkneſſe; I ſhould alledge many reaſons for it, but it's ſo needleſſe to ſpend time about it, as it might well be thought a great abſurdity. What then remains? but that ſome publique ſpirited Patriot that would immortalize his name and honour in the procuring of this ſo neceſſary a thing to be ſpeedily effected, wherein alſo as the generall good he ſhall do, ſo the benefit will be ever great to thoſe that ſhall undertake the carrying over this Coyne; be it what it will be, all men know it ſo well what the gain will be, as there's no need to name it in particular manner, they cannot wiſh for more profit then that will be to the undertakers, and the Colony will with all their hearts be content with it, and eſteeme them happy and thrice happy Benefactours.

The ſecond thing is, that a Publication be procured and ſent to the Colony in *Virginia*, declaring unto them, that there ſhall be liberty for all men to bring from thence for the ſpace of ten years to come, any commodity that they ſhall there raiſe, into *England*, Cuſtome and Excize free, (Tobacco onely excepted, which may pay double Cuſtome, if ſo thought fit:) and further that to what value of money ſuch commodities ſhall be ſold for here in *England*, (being rated at the Cuſtome-houſe at their entry;) it ſhall be lawfull to carry out to *Virginia* any Commodities again to the ſame proportion & worth, Cuſtome and Excize free.

Theſe two reaſonable things granted; as they ſhall infinitily with all ſpeed advance the Plantation, ſo ſhall they (all things duly weighed in the ſcale of prudence) be no leſſe beneficiall to *England*, as all men that have their eyes in their heads, and Engliſh hearts in their bodies, ſee and apparantly know, nothing more ſure and certain; and all ſtable and needfull Commodities brought out of all-liberall-*Virginia* into *England* at a very reaſonable rate and price, much cheaper then now we have them, and are fain to fetch them with great hazard from doubtfull friends, or Heathen Nations, to their great enriching and our own impoveriſhing, as to all knowing men is

most apparent; we shall be free from the usurpation of forreign Princes and States in our Estates, Lives, Liberties and shipping: and we may conclude boldly and rejoycingly, that Providence hath provided this all-sufficient Countrey of *Virginia* against these times, and to these intents, that hence we may have all we want from our own brethren, our Navy there increased to what number we please, for this incomparable land affords naturally all whate're belongs to the building and rigging of a Navy in all compleat manner from top to toe, as may be said; and by a safe, a sure, certain, easie, near at hand westerly discovery, (part by land, and part by Rivers and Seas) contract all the riches of the South-sea, the *Molocos*, *Philipines*, *China*, *&c.* by 3000 leagues neerer to us, without molestation by any Prince or Pirat, and shall not need at all to be troubled, if *Russia*, *Poland*, *Denmark*, *Sweden*, *Norway*, *Germany*, yea *France* *Spain*, *Italy*, *Constantinople* were removed 5000 times more distant from us: for in one word, what ever these Countreys afford, either necessary or superfluous, all-sufficient *Virginia* within its limits will produce unto us. And shall there not I say then now be found a zealous Patriot, that will stand up for his Countrey, and procure these things to be done out of hand? Now God forbid; I commit the businesse to God, having done what I conceive my part is, who onely have good wishes, and daily prayers to attend this enterprize, which God prosper, *Amen*.

Sir Francis Drake was An. 1577 in a Westerly Sea one the back of Virginia, in 57 degrees in opposite to the head of James Town in Virginia and he sailed from that Countrey which he called Nova Albion, in an open Sea to the Molocos and China, and so that also this way a trade may be made to those places to the back of Virginia, &c.

POSTSCRIPT.

At a friends importunity, (the former part sent to the Presse) I am thus enforced to make this Addition, and upon the great hopes that upon triall it will be found, that you may have two Silk-harvests in one six moneths time; of the eggs a second brood may be hatched in *June*, and so fed by Mulberry-leaves, though then it may be it must be in an house, that then for the promoting of such a good designe nothing of incouragement may be wanting, nor any obstructions in the businesse, under pretence of wanting needfull housing for to feed the wormes in. Thus much I will assure you,

That

That the slightest and simplest kinde of housing or coverture (though the books are too superstitious and ceremonious in the rules which are many that they give concerning the ordering of the worm, which are not so necessary as they pretend;) I assure you, you will abundantly content and satisfie this, though noble, yet most humble creature, even with any habitation to do her work in. And to this intent I now declare unto you, (that all excuse may be taken from you) that the poor simple people in *Italy*, *Spain*, *Languedock*, *Provence*, &c. do keep and feed their Silk-worms in the same low earthen-floored Rooms, wherein themselves lodge and do all their houshould-affairs, feeding them on shelves and on tables, giving them leaves without any more curiosity, and they thrive and prosper with them as well as in the greatest Cities and stately chambers of the greatest rich mens Palaces.

Sicily.

And that in *Sicilie* and *Calabria*, the common Silk-Masters there do at time of year in the Spring, set up only slight boarded houses in the fields round about the Mulberry groves, and placing shelves in the inside of them, two foot one above the other to the roof, and a table all along the mid'st of the room, they strowing their leaves on these shelves and table, there feed their wormes, and there they spin in the room their Master lies for the space of five or six weeks time, and they have abundance of silk without more ado, and a man and a boy will tend all the worms that come of six ounces of eggs, and those wormes will spin 60 pound-weight of silk, and that but at 20 *shil.* the pound, is worth 60 *l.* in ready money, a sufficient gain to allure a man to the work I trow; but the gain by the naturall worme multiplying will farre exceed it. And I may not forget yet more that the Persian manner is to pitch up onely tents of *Canvas*, and Booths round their Mulberry-woods, and there-under they strow the Mulberry-tree-leaves on the ground: there their wormes feed and live and spin, and do well in all kindes, the *Persians* living also the time of five weeks in the tents. Thus all these examples do manifestly prove unto you, that very simple and slight housing and a little coverture will content the Silk-worms, and they will thrive well in them. And thus you see that very poor and slight houses in *Virginia*

The great gain of the Silk-works in a house, how much more in the trees, will it be to you.

The simplest and slightest houses or covertures will be sufficient for the Worm to feed in, and live and spin, let no man doubt it, &c.

will do the deed. Nay rest assured that the very Savages houses built but with Poles Arbor-wise, and covered top and sides with mats, will be abundantly satisfactory to the wormes, and they will thrive in them as you shall finde upon triall. And let me tell you, being desirous that you may do all things with the least cost and labour to you, and to invite also the Savages to the work for their own gain; do but take your Reeds and small Canes in *Virginia*, and run but a strong needle and threed thorow the Reeds which will hold them together, and so you may presently make shelves and tables with them as narrow and as broad as you please; and in truth you shall finde this kinde of shelf and tabling to feed your worms on much better in many respects then boards: but you may make triall of the Persian way also by strowing your leaves on the ground in these houses, and so feed them, and so your second brood of Silk-worms may also be thus kept and nourished in this kinde of housing and coverture; Experience is the Mistris of fools, saith the Proverb: and it is not an unwise mans part often to make trials, though to some men they may seem impossibilities, yet rare and strange things have upon triall often been found out; and if you would but shew the Savages samples of all kinde of things, you should soon by them know more in a moneth what is in that Countrey to be had then you have done these 40 years; and for reward they would bring in of all kindes unto you, what they have and you desire to know, so a sudden discovery may be made of all things in that land to your infinite gain.

Concerning the winding off your Silk, this Lady hath sent you one of the wheels, so that by it all of you may make the like to do that work, so you shall want nothing to speed the work

To conclude with this *Memento*, that there are nine things that appear, are of no or small difficulty to you and the Savages to enterprize, and get gain and wealth to be produced from these Commodities; I will but name them and leave them to your better judgements and thoughts.

1 This Silke, so easie, speedy, and profitable a thing.

2 The Silk-grasse naturally there growing, which to the *Indians* the onely labour is of putting it up, and bringing it to you at such a price; a rich Commodity if known.

3 The planting Vines, small labour, little cost, long enduring.

4 And

4 The multiplying of Cunny-warrens, so easie a thing, the wool of a skin now worth 8 pence, which is more then the body, yet the flesh is considerable meat; the wooll is and will be very vendible for this new Invention, not onely of these fine light hats now sold at 15 and 20 *shil.* but the spining of the wool, and making stockings of it as fine as those of silke.

5 The increasing of abundance of Bees for wax and honey, their food so plentifull in *Virginia*, as in no Land more, and if with an hatchet you do but slash your Pine-trees, Firre-trees, Locus, and other trees, there will store of liquor come out of them, on which the Bee will gather infinite store of honey and wax, as in *Russia* and other Countreys they do.

6 The planting of Sugar-canes, that being no more laborious then the Indian wheat, setting it, and once set in good Land they grow eight or ten years, and the Indians pains will onely be to cut them yearly down, and sell them to you.

7 That of the Cotton-tree is the like for many years, gathering of the cods of woll from them, as we do Roses from the Rose-bushes.

8 That of Ginger soon done, the planting and the gathering of it.

9 That of grafting your Crab-trees with Apples and Pears for Sider and Perry, you knowing that a man in one day will graft an 100 stocks, and they will grow night and day, while you eat, sleep, and play, and last 100 years to your great gain and profit.

I may not further inlarge my self for the present, these are but tastes and hints for your better wits to worke on: so with a thousand good wishes, I bid you adiew.

Floreat VIRGINIA.

The fashion of the Botome.

The Silke Bottome of the naturall Worm in *Virginia*, found there in the Woods, is ten Inches about, and six Inches in length to admiration: & whereas ours in *Europe* have their Sleave and loose Silke on the outside; and then in a more closer covering they intombe themselves. These rare Worms, before they incloſe themselves up, fill with Silke the great emptineſſe, and afterwards incloſe themselves in the middle of it, so they have a double Bottom.

The looſe Sleave Silk is all on the outside of this compaſs, for if that were reckoned in, the compaſſe of the Bottom would far exceed this proportion: But this is ſufficient to be the Wonder of the whole World: to the Glory of the Creatour, and Exaltation of *VIRGINIA*.

A Loving Advertiſement to all the Ingenious Gentlemen-Planters in Virginia *now upon the Deſigne of* Silk. By V. F.

Gentlemen,

SVch hath bin the ſingular favour of Providence to you and the Lady, that ſince the publiſhing of this Book; it hath ſo happily lighted into the hands of divers worthy perſons, being not only Gentlemen-Travellers of credit, & Merchants of reputation; but likewiſe wonderfully taken with the love of *Virginia*, and no leſs zealouſly affected to the advancement of the Silk-trade in that Land, which they judge (not of their experience and knowledge of what they have and obſerved in the Eaſterly parts of the World, where abundance of Silk is made) that no part of the World is more proper for Silk then All-ſufficient-*Virginia*: In regard of the excellency of the temper of the Climate, which naturally produceth not onely Mulberries for food, but the Silk-worme it ſelfe, in that wonderful greatneſs of the wilde Silk-bottom: which as they ſay, The whole Vniverſe affords not, nor brings forth the like to their own ſmall admiration. And that there is no greater quantities of them found or ſeen they conclude, it is in regard of the birds who are their natural enemies, & devoure moſt of them. And theſe Gentlemen are confident, that you did not know & practiſe thoſe ways and meanes, for the feeding and preſervation of them, as in ſome far remote Regions is practiſed by thoſe Nations, that are expert Maſters of Silk-wormes, *Virginia* would inſtantly abound with great ſtore of Silk, and ſurpaſs all thoſe Countreyes in that rich commodity, and you all become with great ſpeed and ſmall coſt, or liitle labour one of the happieſt, wealthieſt people that the World affords. And to the intent that ſuch a bleſſing may not be longer wanting to you, they have out of their ſuperlative benigne affections, and publike ſpirit, imparted to the Lady theſe enſuing Relations, with their earneſt deſires and adviſes, that you all in *Virginia* may out of hand be made partakers of them. And then knowing them; you may no longer live in groſs darknes and ignorance of ſo great a treaſure that you are poſſeſſors

of

of, and may now have and enjoy the full use and benefit of, which hitherunto hath most straingely been hidden from the eyes of body and mind; They conceiving that the chief cause thereof hath been the pernicious blinding smoak of Tobacco, that thus hath dimmed and obscured your better intellectuals; but when you begin to put these wayes & means in practice, they say you will blesse your selves (as they do) that you have not in this long time discovered the infinite wealth and happines that will arise unto you out of Silk. But not longer to detain from you this most precious eye-salve, for the speedy curing of your infirmity, and making you all rich (which is your main aime in that new world).

Hearken well to these Informations, which the Lady earnestly desires may thus be with all speed made known to you all.

The one Traveller declared, That he passed a Countrey where he saw those people had their Silk-worms feeding on their Mulberry-trees in the fields & there they live & spun their Bottoms on the trees, And to protect this noble profitable creature & to defend it from the birds, they used a most slight, simple, plain invention speedily effected & of no cost or labour to them, which was certain great sheets of Reeds or Canes, that they hung over and about their trees, tied to certain poles that incompassed them. And in this easie manner they obtained great abundant quantities of silk, to their wonderful inriching. The sheets of Reeds were joyned together by a need e and thred, running through each Reed at several equal distances, and so drew them close and firm together. This for you to imitate, is in every respect to your wonderfull happines.

Another of these Travellers saith, That he passed a Countrey where the inhabitants did make large Tents or Boothes all of Reeds and Canes, and in them placed shelves and tables made likewise of Reeds, on which they fed their Worms, strewing leaves on them. These tents they set up round about their Mulberry-Groves, and with much celerity, and no cost.

A third Gentleman and Merchant, that lived long in the

farthest

farthest parts of *Turkey*, affirmeth, That there the inhabitants begin every Spring, *March*, to feed their Worms, and continue it till *October*, six moneths time: their Worms hatching & re-hatching, one generation or brood succeeding the other: so that they have three harvests of silk-bottoms, in that space of time, every five or six weeks one: they feed their Worms in great long Barns made of Reeds or Canes, the walls and roofs of them, and shelves as aforesaid, and the Wormes when they have done feeding, spin their bottoms upon the reedy walls and roofs; and that they have two crops of leaves from their trees: for those trees that have their leaves pull'd off in *March*, *April*, and *May*, do re-leave again, and have new and fresh leaves in *June*, *July* and *August*, wherewith they feed their latter generation or brood of Wormes very profitably.

And in confirmation of this, you shall know, the same hath been found true in *England*, that the Mulberry-tree will leave twice in a Summer, the Lady had the experience of it, and therefore much more will it do with you, which will be a most singular advantage to you.

I must not omit to add what these Gentlemen farther advise, that you can never sufficiently augment the store of food for this Noble Creature: for store of food is the main foundation, upon whose speeding the Silk-trade is to be erected: for if that be not wanting, no obstruction can be in it. For the glorious Worm is so infinite in multiplication, with that celerity as is incredible, so that she will never be defective unto you: they therefore counsell, that you graft your Mulberries with all care and speed upon these severall trees, upon which they will exceedingly thrive, *viz.* the *Popler*, the *Elme*, the *Chesnut*, *Beech*, *Quince*, *Medler*, *Fig*, *Peare*, *Apple*, and *Cornell*-trees. And also upon any other trees, of which upon a trial you find the Worm will taste or eat their leaves. Likewise that you set of your Mulberry-slips as big as your thumb, about two foot long: and put them into good wel-digg'd ground in *September*, setting them a foot in the ground, bruising the ends of them, and watering them the next Summer well, if need be: in the same manner as in *Kent*, they set the

Codling-slips. That you also cause the *Indians* to bring unto your habitations all the young Mulberry- trees that are within an hundred miles of your Colony. But let me acquaint you that they admire what some Gentlemen Planters of credit tell them; that your brave Wormes do not only live, feed, and spin upon the Mulberry-trees in the Woods, but do the same upon the *Poplar*-trees, *Plum*-trees, and *Apple*-trees:: such an incouragement to the *Silk-trade*, the World (say they) never yet heard of before, which must needs lift you up to a most speedy and incomparable height of wealth and riches, in a moment of time.

And by your gentle patience and generosity, give me leave to propound unto you, the earnest request the Lady hath to all of you; that you please to inform her (being also the desire of many others) how it comes to pass that your Wormes get to your severall trees, not only to the *Mulberry*, but to others: For in no other Countreys the *Silk-worme*-flie doth use her wings to flie with: so that yours must either do it (and so at time of yeer couple and flie to sundry trees; and there lay their eggs which remain till Spring again) or that your trees do naturally ingender and produce the Wormes (as it is conceived, the original of them so hapned at first) but which way soever it be, it's rare and remarkable; and proves *Virginia* to be one of the most superlative Countreys in all the Vniverse for the *Silk-trade*; and none comparable unto the excellency of its naturall temper for *Silk*.

Then that you also inform her all you can of the nature, actions, qualities and dispositions in all kindes of this most wonderfull Creature, every way so admirable, what by any *English* or *Savage* hath bin any way observed in her: when her eggs first hatch, then how long time she is feeding before she spins, upon what part of the trees she fastens her Bottom; How long she continues in her Bottom before she comes out a Fly, then when they couple, where they lay their eggs, upon what part of the trees? How long they live after that time? For these in the old World never eat after they once begin to spin: how large in bigness and compass are commonly their bottoms? if all of one colour, or divers? In what part

of

of the Countrey are most of them seen and found? what do the *Savages* call them, or know any use of them; what birds are they that most devoure them? (for did they not, they would swarm all the Land over in a very few yeers); if any thing besides birds be hurtfull to them? Their greatnes and doubleness of their Bottoms are wonderful, none ever known to be so, which argues the strength and richnes of this noble Worm, her vigour and hardnes exceeds, that can endure all wethers and seasons both alive and in her eggs. A great incouragement to you all that she is not a nice curious kinde of *Silkworme*; but stout and robustous, that will require little care or attendance, of small cost unto you. But her food and protection is all she requires, and pays you ten thousand-fold for what you bestow on her. That you please to send of her Bottoms to satisfie all men, who are like the Queen of *Sheba*, much better trust their eyes than eares; some of their eggs likewise upon that which they lay them, and the Fly (though dead) which will many a yeer retain her perfect form in a box: do not the wormes hatch and spin twice or thrice in a Summer?

Let me add one Petition more, and I have done. *viz.* That some of your precious Silk-grass may be sent the Lady, who is confident upon the triall she will make of it, she will give you so pleasing an account and so profitable unto you, in making known unto you what an unknown wealth you have: she prays you (and all is for your own gain) to bore and cut all your trees (a most easie thing) and thereby you shall discover presently, what rich Gums, what Balsoms, what Oils, and precious healthful Liquours they will yield you for profit & necessity: For all men know that many kindes of trees do yield most pleasant and healthsome Wines (as I may call them) for man to drink; so also you will finde out all sorts of Dies and Colours (instantly done): cut and bruise all kindes of your Woods, Barks, and Leaves of Trees, Roots, Berries, Nuts, Fruits, Plants, Weeds; and but boil them in a Skillet, and then put in a little piece of white Woollen or Linnen cloth with some Allom, and you shall instantly finde and see what rich Colours they will make. What is *Indico* but a Weed, so

Woad and *Madder*? What is *Brasil*, *Fustick*, *Logwood*, and many more kinde of Dies, but Woods? what Coucheneal the rich Scarlet die, but a Fly, or the excrements of the *Indian* Fig-tree? what is the new-found rich dying stuff of 25. *l.* a Tun, but of a tree that is brought from the Island of *Liberty*, neer Cape *Florida* where Captain *Sailes* plants? And shall *Virginia* not yield a drop of good Liquour or Colour? It cannot be; if but a triall thus easie were made.

By burning of all kinde of Woods and Gums, you'le soon finde by your nose what sweet Perfumes they yield. And by the ponderousnesse or weight of earths, you may know if Minerals or not? Let it be known also, if you have not Waters of more than ordinary qualities; for taste, colours, smell, weight, hotnesse, or coldnesse? there is much depends upon them. And you shall know if they proceed out of any Minerals, by taking a glass full, and putting into it a Gall beaten to powder, which will turn the water into a reddish colour: and send samples of all kinde of strange earths, and of all other kinde of things without fail. And lastly, (if it be not too much presumption to beg the favour to receive that honour from you) which she no wayes deserves nor can hope to requite: To inform her what be the things, the wayes, the means to advance *Virginia's Prosperity*, if they may be procured and effected. If any errour be committed in telling you all this: there is hope your pardon may be obtained, seeing your onely good and benefit hath caused all this that hath been said: and the zeal of your wealth and happinesse hath drawn all to this length:

Sirs, you have the faithful testimonies of those aforesaid worthy Gentlemen, and nothing can be now wanting unto you but putting all in practice, what they have declared; and for your good are such invitations and incouragements unto you, that more cannot be wished for. There remains nothing but humble thanks to God, and to these Gentlemen your due respects, whom God hath made such Instruments for your happinesse, hoping their noble courteous examples will allure all other Gentlemen Travellers to cast into this good work some mites of their further knowledges, and every man

to

to contribute his prayers and help to this or any other hopefull designe: seeing the consequence of them may be so good and great, not only to the *English* Nation at home and abroad; but to the poor *Savages* their welfare of souls and bodies, which God grant.

An Other Advertisement.

THe Silk-Trade, (unlesse we will be deaf to Reason and Experience) cannot be denyed the precedency of all Trades that are at this day a foot, in either World: And that in regard of its great and certain gain in so small a time; A man and a Boy being able to tend as many Silk-worms in two Moneths space, as will yeeld you sixty pounds: * which done, they leave you ten Moneths free for any other imployment. In regard of its small skill, lesse pains, care and labour, no hazard, no cost or charge, (more then a twelve-penny Reel) no troublesome tools or Implements: in regard of its incredible ease and pleasure, as not requiring strength of Body, of Wit, of Purse, any stock to begin with, only hands and eyes to gather leaves and feed the Worms with, or protect them from the Birds: if kept on the Trees (their natural Mansion:) Admitting of all Ages, (for a Child can do all that belongs to it) all Sexes, all Qualities, (a most fit recreation for Ladies, especially being begun and ended in the two pleasantest Moneths of the year, *March* and *April*.) And all Callings too; for if Saint *Paul* made Tents, who can plead exemption from tending Silk-worms? * Again, Silk is lesse chargeable in Ware-House, Fraight, &c. then any other Commodity, and yet none more durable, lasting, neat, vendible, nor more easily transportable: for Five hundred pounds worth of Silk, fraights lesse, and takes up lesse room then ten pounds worth of Tobacco.

According to that is made in Sicille by a Man and Boy.

A most proper imployment for the lasie Indians.

Now where Worms and Food abound naturally, and the Inhabitants are born with Brains, the advancement of the Silk Trade must needs be proportionable: upon which double score *Virginia* hath the advantage of any place in the yet discovered World; I mean for Worms and Food, which may be thus severally demonstrated. Their Worms (partly annually pro-

produced by heat and moysture as our Caterpillars and other Insects each Spring, partly by Eggs which have escaped the Birds who are the greatest cause of their scarsity (which otherwise would swarm over all the Land) devouring them when they are Worms, Eggs and Bottoms) exceed ours not only in strength, hardinesse and greatnesse, (being when Flyes as big as mens Thumbs) but also in the largenesse of their Bottoms, which are as big as Limons; (for Mr. *William Wright* of *Nansamond* found of them above seven inches round) and one of them weighs more then a score of ours; insomuch that whereas a Thousand of our Worms made but one pound of Silk, worth at most here 30s. a pound, a thousand of their natural Worms will make ten pounds of Silk, worth here twenty shillings the pound. And certainly they need not object or be troubled at the somewhat more coursnesse of their Silk, since they from the same number of Worms receive ten pounds in mony for our thirty shillings.

As for their Food, the *Virginia* Worms feed not only on the Mulberry (their sole food in all other parts of the World) but also on the Crab, Plum, Poplar; Oake, Apple, Cherry and Pohickerry-tree leaves, with sundry other shrubs and bushes. For proof whereof, Mistresse *Mary Ward* sent over to her Couzen ten bottoms taken from Apple trees. Esquire *Ferrar* her Kinsman likewise sent her ten more, pulled off from Oaks and divers shrubs. Mr *Laurence Ward* some taken from the Pohickerry tree, Mr *Wright* from the Cherry tree. So Mr *Russel* and others.

The Objection, or rather groundlesse surmise of the Worms being hurt by Thunder in *Virginia*, is sufficiently cleared, not only by the Natural Worms living so well, and thriving there so admirably on the trees; but also by trial made there this Spring of our Worms. That ever to be honoured Noble Squire *Diggs* having (at his very great charge) sent for two *Armenians* out of *Turky* skilful men, and made ten pound of Silk, which had not want of Eggs hindred him, would have been so many Thousand pounds.

Nothing then wants to make *Virginia* rival *Peru* for wealth, more then to perswade the Planters to provide themselves this Winter

Winter (to lose no more time) of as many of the Natural Worms bottoms as possibly they can. They will now be found in the Woods on the dis-leaved trees, though most of them are spun by the Worms on the tree leaves, which falling to the ground, they perish with them; and this is another great cause that so few bottoms are to be found. The Bottoms thus gotten must be carefully kept in some long boxes till the Flyes come forth, happily in February or March. For they remain in their bottoms 300. dayes, ours but 20. so that their Eggs (whereof one female will lay a spoonfull, suppose 500.) lye unhatched but about nine dayes, ours nine moneths.

When your Worms are hatched, you may keep them either on the trees (being assured that they will live on that kind of Tree whatsoever it be from whence you took your Bottoms) and then you shall need onely to protect them from the Birds; or else in some slight kind of housing, Reedy arbors, Indian mansions, or what else you can devise there cheapest and speediest, and then your onely labour and care is to give them leaves, which you may either strip off, or clip from off your Trees, or if you will, lop off little branches (which may perhaps prove a good way for you: for thereby the leaves will remain the longer fresh) and give them to your Worms, who for the labour of every Man and Boy thus inployed only in two moneths time, will repay you with three score pounds worth of Silk.

Your own Experience (Gentlemen) will I hope ere this time twelv-moneth certifie you of the truth that is here set down, unlesse you shall rather chuse to hugg your own poverty, and make much of that slavery and drudgery you wear out your selves with, in toyling about that contemptible, beggarly *Indian* Weed,

TOBACCO.

The Copy of Esquire *Diggs* his Letter, to his much honoured freind, *John Ferrar*, Esquire at his house at little Gidding, in Huntingtonshire. From *Virginia*, June 21. 1654.

Sir,

I Have received your many and severall Letters, printed papers, and Quæries; and, would my occasions have permitted, I should ere this, have given you that due thanks you deserve, and punctually have answered all your judicious and pleasing Quaries: But I was so taken up in sending dayly for Mulberry-leaves, as they are now so far scattered from my present Plantation, that I could not possibly answer your expectations; That onely difficulty made me to make but 400. pound weight of Silk-bottomes, which I caused to be wound of 7. or 8. l. of Silke in a day: Sir, I doe very well approve of your last well printed Paper, sent the Colony for making triall of the Naturall Silk-worme, but such was my ill happe, that I could not this spring meet with any of those Bottoms, but shall this next Winter procure of them, all I can; Sir, I am now confident, I have conquered all the great feared difficulty of this rich commodity, and made its sweet easy and speedy Profitt so evident to all the Virginians (and that it doth not at all hinder their too much beloved Tobacco, *but that they may proceed with both together) that now I doubt not (nor they) but that in a short time here will be great quantities made of Silke; you in* England *will reape much advantage, and gaine many waies by it, (more then most men can pet see) and I by Gods blessing the comfort and joy, in setting up so noble, so beneficiall, a staple vendible commodity. My people differ very little from the rules set down in your, Mr.* Williams *his Booke, and as Esquire* Samuell Hartlib *hath also directed in his advertizement of Silk-worms unto us; only in the hatching of the Worms-Eggs, they are more curious, of which I shall, when I have more time, give you a more particular accompt: I made* 10. l. *of seed or Eggs this spring to give away to diverse Planters, that are very earnest (seeing so great a benefit before their eyes) to become also Silk-masters, you need not feare it but that this next spring there will be divers tryalls made of the hopefull Naturall Worms, that you so highly prize (and not without good cause) and which is more, perhaps they may fall one after another*

ther and be re-hatched that we may have a double Silk harveſt in one ſummer (as you have formerly hinted to us). Pray Sir will you be pleaſed at this time to excuſe my too much brevity in this great buſineſs of ſo much concernment, of ſo much happineſs to this Country, and attribute it to my great haſt, and much buſineſs upon the ſhips ſudden departure, having many more diſpatches to make to Freinds; But in my next, I ſhall make you double amends; I pray preſent my ſervice to the vertuous Lady Virginia: *Sir I daily pray for your long life, and well-fare, and now reſt.*

Sir your moſt humble Servant,
Edward Diggs.

A Way Experimented by Mr. Farrar, *to make the Gummy-hard Naturall* Virginia *Bottoms (which hetherto by no art could be be prepared to unwind by reaſon of the Gummy hardneſs) to unwinde with eaſe, to the great advantage of the Planters of the Silk-trade in* Virginia.

YOu muſt take Sope-boylers lye or liquor, which is very ſharp and ſtrong, and ſet that in a veſſel over the fire till it be warme, then put in as many of your hard gummy Bottoms as you pleaſe, and let them reſt in that liquor, till it be ſcalding-hot, and ſo remain half a quarter of an houre more or leſs, till they be ſo diſſolved, that you may take out one and find it fit to unwind; which you muſt thus doe.

Firſt put the Bottoms into ſcalding clean water, and having layen a while therein, then take them out and proceed to unwind them as the cuſtome is.

In caſe Sope-boylers lye or liquor be not to be had, you may make a ſtrong liquor of the Aſhes of any Wood, with boyling water, the ſtronger the better, and this may and will alſo perform the work. And this is juſt as you make a lye to buck clothes withal. Only note it muſt be very ſtrong made.

An Extract out of a very Ingenious Gentlemans Letter from Dublin, *Concerning the Reformed* Virginian *Silk-worm.*

I Thank you for your *Virginian* Paper. Me thinkes the Experiment is most Natural to my apprehensions, that the Worms should feed and thrive best upon the leaves growing on the Trees, rather then in the Houses, and that they, like other Caterpillers (of whom these are a sort) did at first breed so, and that Houses were rather an Invention for expediency,

But their Proposition about Money to be carried to *Virginia*, I utterly dislike; even somuch as if it were possible, I would banish Money from *Ireland.*

An Animadversion upon the Letter from Dublin.

I like not the Gentlemans Reason why he likes the Proposition concerning feeding of Silk-worms upon the Trees.

For almost all Plants, even the most rare now in use were Originally (namely since the deluge) wild and past muster amongst Weeds, & are improved to such a degree of excellency to the eye, nose or palat, by industry and home-helps and contrivances: So *John Tradeskin* by *Lambeth*, by the advantage of putting his Trees, and other Plants into a warm house in winter or a stow, nurses up those things faire and fragrant, which would without that help either dye or be dwarft. This is the reason why tame Pigeons or Conies are larger, and breed better, and oftner then wild. Yet I conclude not against the thing it self; for questionles, that the leaves have more heart, fresh and greene, then halfe withered, if the cause of their withering were known or considered, But I can say little to this, as having no experience,

A new observation, concerning the feeding of Silk-worms with Lettice, imparted from Dublin.

I Have only to present you with some observations I made concerning the feeding of Silk-worms (meeting here accidentall

cidentally with a kinswoman of mine that keepes great store of them) which generally is beleeved only to be don, with *Mulberry* leaves: the contrary of which is here by some praectiled. *viz.* to feede them with Lettice; which the worms eat very readily, grow as big as those that are fed with Mulberry leaves & spin as much Silk: They wil also eate the hearb called *Dantedelyon*, but whether that will so well agree with them as *Lettice*, *I* have not tried, but with *Lettice* they will thrive very well, eating nothing else all the yeare.

More Observations concerning the feeding of Silk-worms with Lettice,

SIR,

MY good Cosen Mr. *W.* sent me the letter, you wrote to him; and the note sent you out of *Ireland*, that intimated the happy succes the Gentlewoman had then in keeping Silk-worms, not only on the Mulberry-tree-leaves, but with Lettice leaves, the thing you much desired that my Daughter should have made known unto her. Truly Sir your singular humanity and goodnes in all things more and more extends it selfe for the publique benefit of all, and I see to the particular satisfaction of your Freinds, though Strangers to you yet those that have daily cause more and more to honour you, as we justly do. Sir, this your favour is both by my-self and Daughter so much resented as it requires from us, very hearty and particular thanks to be tendered to your worth. She is a lover of Rarities in these kinds, and to try conclusions upon her Silk-worms, and no way envious, but much rejoyces to hear that any have had that good succes with Lettice as you write of, and shall her-self againe make a third triall in that kind, for she hath 2. yeares last past tryed her-self to have kept some with Lettice leavs & so did & they thrivd as well as those kept with Mulberrys, but stil when the time of spinning came they would not spin, but then dyed and this put her out of heart to try further, yet I may tell you, she perswaded a Gentleman near her to keep some with Lettice 25. daies and then fed them with Mulberrys at last, and these did very well and spun as good Bottoms as those wholly kept with Mulberry

leaves. But now she resolves upon your intimation of the experiment made in *Ireland* to try a third time, and to give you an accompt of her success in *June* next, if God permit.

And now Sir she presents this printed inclosed paper to your worthy judgment, if you find not it matter of consideration and reason for her to send it as a second new yeares gift to *Virginia*, hoping that it may do good there to the Planters and informe them of much truth, and invite them to the business of Silk, which God grant, *Amen*.

This other paper of Ryming lines (for Verses they deserve not the name) yet being that what her Brother a young Scholar hath collected out of Letters, that were sent her from *Virginia* and given her, she also sends you to further informe you of things done last spring.

Thus worthy, Sir, with the due respects of both our kindest salutes, wishing you all happiness in this and the better world, I rest ever.

Yours in all love and service
JOHN FERRAR.

Littell *Gidding Huntingshire*
this 28. *Novemb.* 1653.

SIR,

She makes bold to present you with a sample of *Virginia* Silk-grass sent her by a freind. It's a rarity, and she hopes will delight you who have such a publique Spirit to rejoyce, and further a Common good; as she hath great hopes this will prove a commodity next to the Silk there, as skilfull men and Artists do assure her of it, and thousands of poor people will be set a work with it, if it prove there to be in quantity.

Upon

Upon the most Noble, Virginian natural Silk-Worm her wonderful, various, plentiful food; The infinite, speedy, great wealth she will produce to her protector; (in 45. days the time of her feeding) with small labour, cost, or skill, (learnt in an houres space by any child.) The singular aptness of that rare Superlative Climate, in Breeding them on so many several kinds of Trees in her Woods where they live, Feed and Spin, their mighty large, strange, double-bottoms of Silk: To the admiration of this our Old World; but to the exaltation and glory of incomparable *Virginia*, in the New.

WHere Wormes and Food doe naturally abound,
A Gallant Silken Trade must there be found:
Virginia *excells the World in both,*
Envie nor Malice can gaine say this troth.
Many a man the causes faine would heare,
How these rare Worms came first or still come there.
Insects produced are by heat and moisture
Who in strange shapes and formes do oft appeare.
In Spring our trees the Caterpillers reare;
Their trees likewise these noble creatures beare.
And some proceed from eggs that scaped are
From their enemies sight, which thing is rare.
They feed not only on the Mulberry
Which in our World sole food is held to be

For all such precious Worms of that degree:
But Popler, Plum, Crab, Oake, and Apple tree,
Yea Cherry, and tree called Pohickery:
So on the Shrubs and Bushes feed full many
Her Worms are huge whose bottoms dare
With Lemmons of the largest size compare.
And twenty one of ours will sure poize less
Then one of theirs for weight and ponderousness.
Master William Wright *of* Nansamound
Found Bottoms above seven Inches round.
And though the Silk prove not all out so fine
As Persian, *that's no let to the designe.*
For since a thousand of our Bottoms make
But one pound of fine Silk, you'l ten pounds take
From theirs. If we at Thirty shillings sell
Our pound, for twenty they'l afford theirs well.
The paines that's taken is alike in either
But the gaines by theirs eight times greater:
Then, we confined are to the Mulberry
For food, their Worms have great Variety.
Her dainty coloured flies and large Worms
In length and bigness do surpass mens Thumbs.
Whereas ours short of little fingers come.
Our flies come out in twenty days and lay
Eggs, theirs not still three hundred as they say
O wondrous thing! a Worm to fast so long
And then come out a painted Fly so strong.
Nine mouths full out our eggs unhatch't remaine
Nine daies in Spring makes theirs revive againe
A Planter (I wish they had him named)
A spoonfull eggs from one fly he gained
Which to five hundred at least amounted
Loe shortly endless they must be counted.

In March *they first begin to live and feed*
In Aprill *they have done the Silken deed*
The sweetest, pleasantst time in all the yeare.
You to this Wealth the chanting Birds will cheare
And ten moneths time they leave you with great ease
To spend it in what profit you shall please.
Rare Worms who feeding five and forty daies
On leaves of sundry Plants and shrubs repaies
Their keepers with fine Silke which wants no strength
And yet extends it selfe some miles in lenght
And for the labour of a Man and Boy
They gaine you Sixty pounds which is no toy.
If you from Birds protect them on the trees
(Their naturall mansions) t'will them best please
Your paines is spar'd in giving them the leaves
By which alone you gaine their Silken sleaves
For non-parrel Virginia *in her Woods,*
Brings forth as all men know these precious goods:
Where thousand fleeces fit for Princes Robes
On Virgin-trees shall hang in Silken Globes.
The noble Worm so hardy, strong and stout
No weather ill is able them to rout.
The reasons why the numbers are so small
Less Cruell Birds devoure most of them all
When they are Worms yea Eggs or Silken ball.
Most bottoms likewise on the leaves are spun
Both falling to the ground do perish soon
Those only found that spun are on the branch
Not by their care but providentiall chance
Which only show themselves when all is bare
To Find in Summer any'tis most rare.
If to prevent both dangers you intend
A Reedy-Arbourwell will doe't, you'l find

Or

Or slighteſt coverture in any kind
The skill and paines to all each Child can do:
As you ſhall find on triall tis moſt true.
And may in Wealth compare with rich Peru.
And for all Tooles that appertaine thereto
A Twelve-peny Reele is all it will coſt you,
No wit, no ſtrength, no purſe, no ſtock will need
But Eies and hands, the Worms to guard and feed.
And thus you ſee done is the Silken deed:
Which brings you ſo great wealth with ſo much ſpeed.
Five hundred pounds worth of rich Silk, all know
Fraights leſs then ten pounds in poore Tobacco
Silkes are no traſh, no toy, nor Pedlars ware;
Staple, good, and ready chinke every where.
Twenty ſhillings a pound t'will yield you cleare
And Ships to fetch it will come flying there.
Queenes of the beſt edition need not ſcorne
In her owne Livery to ſerve this Worm:
Only to give her leaves is all ſhe craves
And in reward with Silk ſhee'l make you brave.
Out of her rich belly by her mouth ſpun
Weaves it into a moſt curious bottom
Which by a Reele turning with hand of man
Is wholly wound off moſt neatly againe.
To feed Silk-Worms no Caling can diſdaine
Seeing they yeild you ſo much honeſt gaine
No imployment in the World ſo likely
To make ſo ſoone your laſie Savage Wealthy.
For his Silk bottoms in exchange ſhall have
From Engliſh, what he ſo needs, begs, and craves
Red coats, hoſe, ſhooes, knives, they highly deeme
Jewes-Trumps, Bells, Beads, all toys, no leſs eſteeme.
If all be thus the cauſe you now demand

Why

Why hath this knowledg been thus long detain'd
And but now by the Ladies Books inflam'd
Ignorance of Planters so strange hath been
Till now ne're knew nor dreamt of this rich thing
Confest it is, that of't some they have seene
Regardlesly, but ne're did them esteeme.
Which loss of Wealth and Honour they'l regaine
And Virgins *Counsell follow will amaine.*
The happy onset they this Spring have made
Assures them all a stately pretious trade.
Sir Henry Chichly *that Heroick Knight*
Affirmes ther's not an ingenuous Wight
In Virginia *but makes all speed he can*
To be e're long a Silken noble man.
And say,Colonel Ludlow *certifies*
That thence from Silk great profit will arise;
Yea worthy Bernard *that stout Colonel*
Informes the Lady the work most facile
And of rich Silken stuffs, made shortly there
He hopes that he and others shall soone weare.
So major John Westrope *saith,Silk will be*
A gallant designe for their brave Country.
Thunder was that, that some men onely doubt
But triall made this Spring puts that feare out.
In all Lands where Worms are kept tis wonder
To heare that any were harm'd by thunder.
Their naturall Worm proves this more truer.
Mr. Gorge Lobs *that prudent old Planter*
Tells her that Worms ne're spun Silk daintier.
Lets give those Gentlewomen their full dues
Mistress Garret *and* Burbage *for Silk clues*
That Colonells Wife needs not farr to rove
Her Court affords a pleasant Mulberry Grove:

But noble Diggs *carries the Bell away*
(Lasse! want of eggs made so small the essay)
His two Armenians *from Turky sent*
Are now most busy on his brave attempt
And had he stock sufficient for next yeare
Ten thousand pound of Silk would then appeare
And to the skies his worthy deeds upreare.
Loe here what mistress Mary Ward *hath sent*
And to her Lady Cosin She presents
Ten rare Bottoms took from her Apple tree
That all England may it beleeve and see.
Her honour'd Kins-man Esquire Ferrar,
To confirme and make the wonder greater
Ten more likewise hath sent her, which he found
On stately Oakes and Shrubs that kiss the ground
And Doctour Russell *that learn'd Phisitian*
Hath with his, made a full addition.
For things more slowly do affect the minde
Which eares do heare then those that eies do find.
Now from smoke Virginia *shall be raised*
And throughout the World be duly praised.
Ah Blest be God that now in his due time
This Silken light apparently doth shine
Then come, O come with sacred Lays
Let us sound the Almightys praise

I. F.

To the most Noble deserving Esquire *Diggs*: upon the Arrivall of his two Armenians out of *Turky* into *Virginia*.

Courage, brave Sir: sith Ayde from God is sent
Proceed, go on, drive forth thy great intent.

A Comparison between the gain and labour of TOBACCO *and* SILK.

TObacco requires 9 moneths time, much care and labour, both without and within dores, and a mans Crop is commonly 15 hundred weight of Tobacco, and this at two pence a pound is 14 pound gain.

Silk requires six weeks time, if done in a house, and by the labour of a man and boy, in gathering leaves, and tending the worms that come of six ounces seed, there is by so many worms spun as much Silk as will weigh sixty pound weight, and this but at 20 *shil.* a pound, yeelds 60 *l.* in ready money.

Tobacco, leaves a man but 3 moneths in the year for other business.

Silk, leaves a man ten moneths time in the year, for any other imployments.

14 pounds a man gaines by his Crop of Tobacco.
60 pounds a man and boy gains by his Crop of Silk.
Then let all men judge which is the more gainfull.

But what will be the gain and profit, by the worms feeding and spinning on the Trees is more considerable, and also the naturall *Virginia*-worms bottome exeeding ours in *Europe* 20 times in bigness, and in weight: what a Treasure then will this be, and no labour, cost, hazard, expence of time at all, a Boy onely to keep away the Birds from eating the Silk-worms on the Trees, &c.

This

Thus learned Bartas *upon this noble & admirable Creature.*

YEt may I not this *Wonderous Worm* pass by,
Of fly turn'd Worm, and of a *Worm a Fly*.
Two Births, two Deaths, here Nature hath assign'd her,
Leaving a *Posthume*, dead-live Seed behind her;
Which soon transforms the fresh and tender leaves
Of *Thisbes* pale tree, to those tender sleaves
(On Ovall Clues) of soft smooth silken Flax,
which more for us then for her self she makes.
O precious fleece! which only did adorne
The sacred loins of Princes heretofore:
But our proud age, with prodigall abuse
Hath so profan'd the old honorable use:
That Shifters now, that scarce have bread to eat
Disdain plain Silk, unless it be beset
With one of those brave Metals, whose desire
Burns greedy soules with an impartiall fire.

Had Du Bartas *fully known all the vertues and rarities in this incomparable Creature, even a miracle in Nature, he would have inlarged his Poems in a more ample manner in the praise of it, to the great honour of the Creatour.* Cui Gloria, *Amen.*

Homo Vermis.

Wee all are creeping Worms of th' earth,
Some are Silk-Worms great by birth,
Glow-Worms some that shine by night,
Slow-Worms others, apt to bite,
Some are muck-Worms slaves to wealth,
Maw-Worms some that wrong the health,
Some to the publique no good willers,
Cancker-Worms and Cater-pillers;
Found about the earth wee'r crawling,
For a sorry life wee'r sprawling,
Putrid stuff we suck, it fills us,
Death then sets his foot and kills us.

FINIS